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del Toro et al.

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(45) **Date of Patent: May 10, 2016**

(54) **KEYBOARD-VIDEO-MOUSE SYSTEM AND METHOD OF PROVIDING AND USING THE SAME**

(71) Applicant: **Belkin International, Inc.**, Playa Vista, CA (US)

(72) Inventors: **Carlos del Toro**, Whittier, CA (US); **Chad Singer**, Santa Monica, CA (US); **Abraham Camacho**, West Hollywood, CA (US); **Jake Diner**, Redondo Beach, CA (US); **Mauricio Chacon**, Fountain Valley, VA (US); **Robert Jeng**, Torrance, CA (US); **Adam Belmonte**, Beverly, MA (US)

(73) Assignee: **BELKIN INTERNATIONAL, INC.**, Playa Vista, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Nov. 5, 2013**

(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation of application No. PCT/US2012/036656, filed on May 4, 2012, and a continuation of application No. PCT/US2012/036663, filed on May 4, 2012.

(60) Provisional application No. 61/482,850, filed on May 5, 2011, provisional application No. 61/483,628, filed on May 6, 2011.

(51) **Int. Cl.**
G06F 13/12 (2006.01)
G06F 3/023 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 13/122*** (2013.01); ***G06F 3/023*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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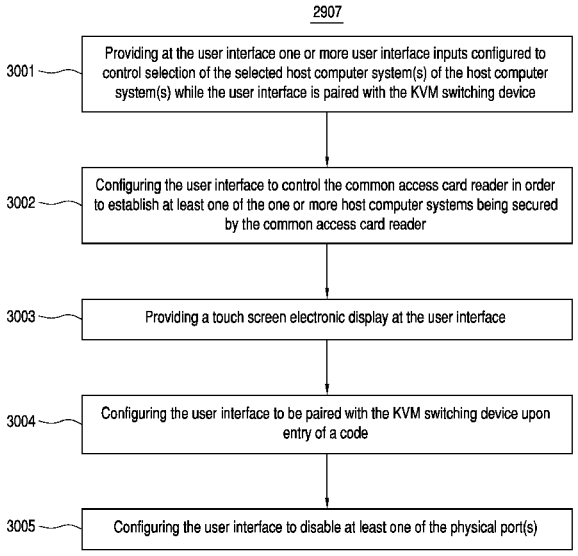
Primary Examiner — Elias Mamo
(74) *Attorney, Agent, or Firm* — Bryan Cave LLP

(57) **ABSTRACT**

Some embodiments include keyboard-video-mouse systems. Other embodiments of related systems and methods are also disclosed.

20 Claims, 23 Drawing Sheets



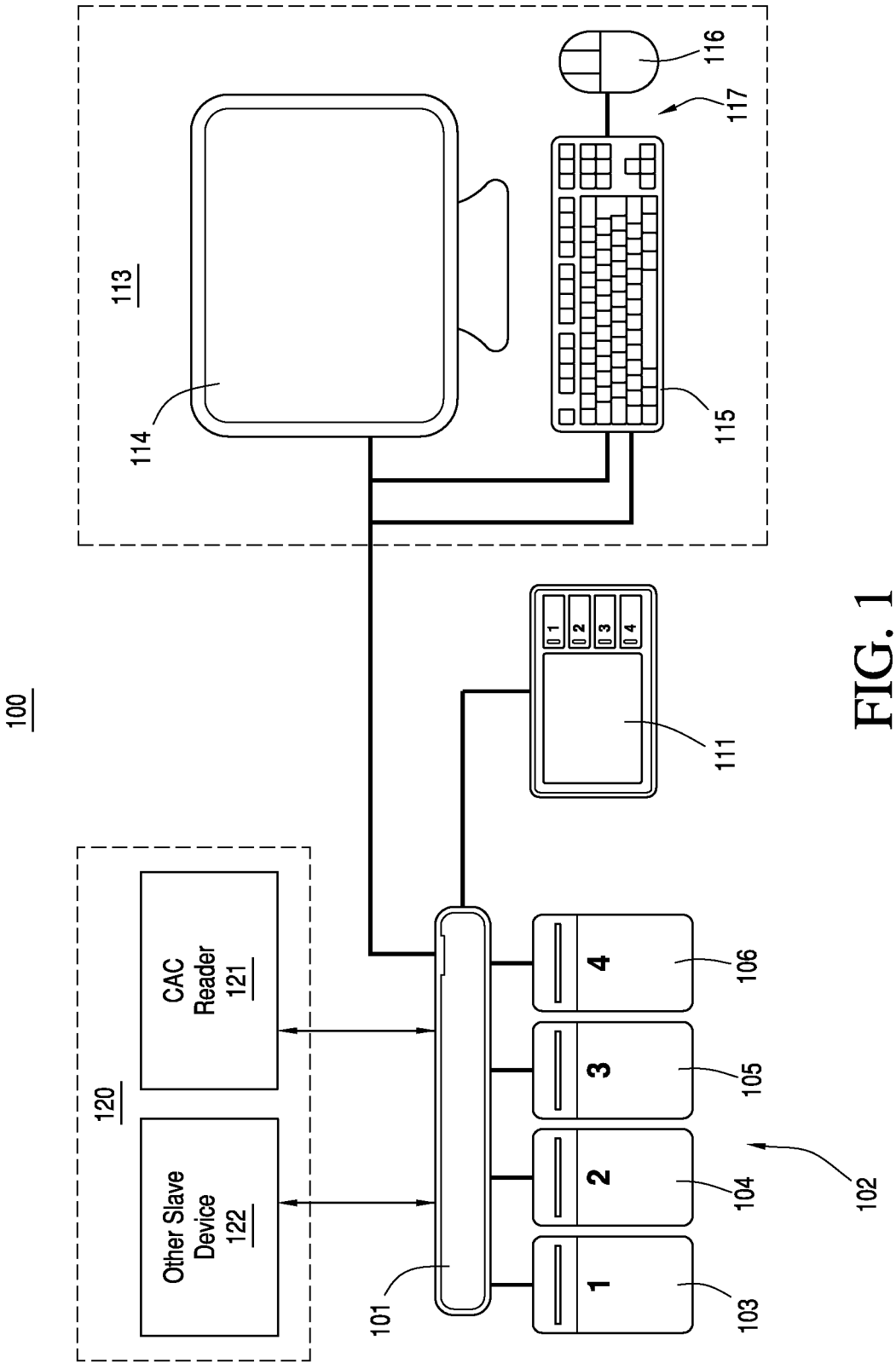

100
113
114
115
116
117
111
CAC Reader 121
Other Slave Device 122
120
101
1
2
3
4
102
103
104
105
106

FIG. 1

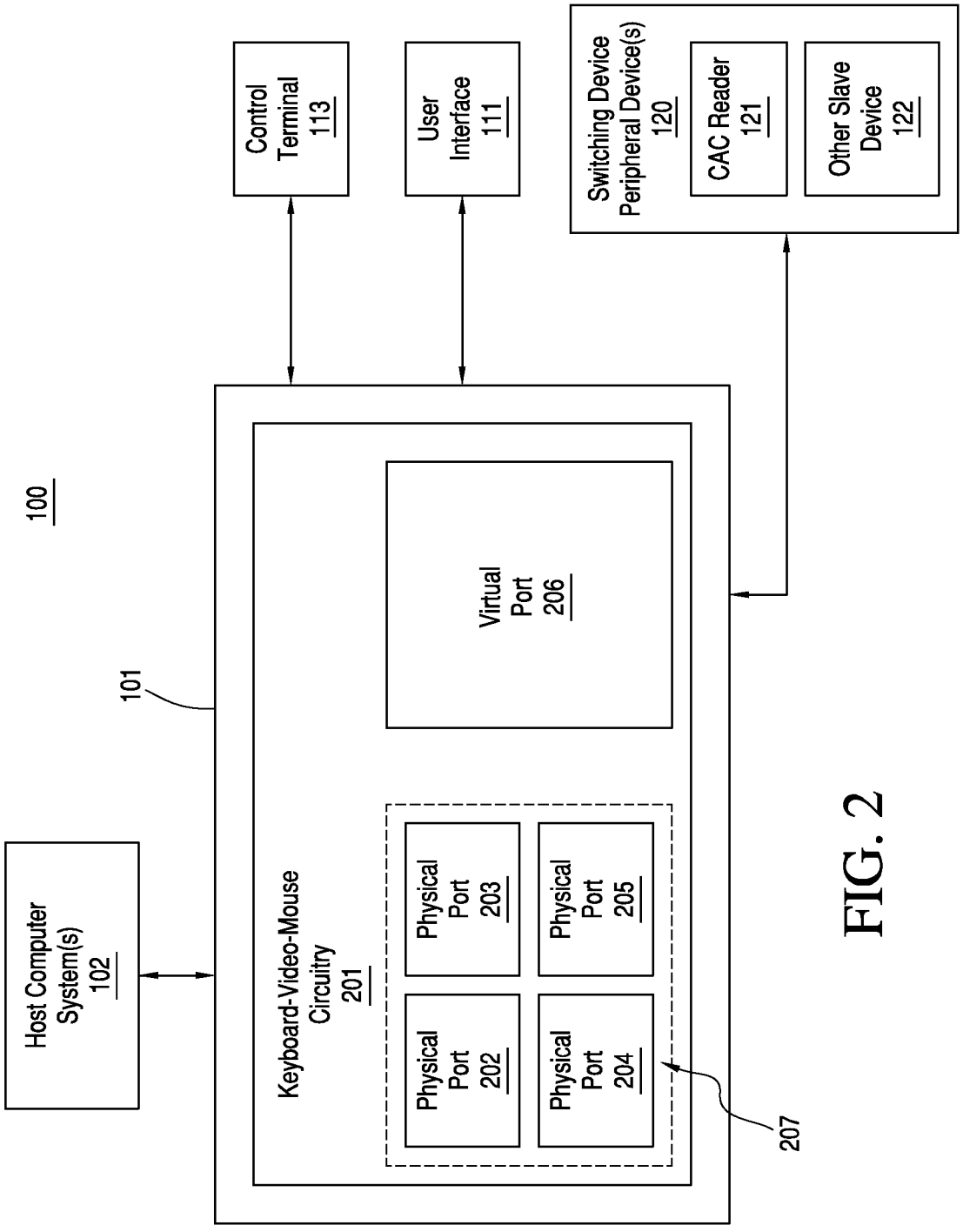

100
Host Computer System(s) 102
101
Keyboard-Video-Mouse Circuitry 201
Physical Port 202
Physical Port 203
Physical Port 204
Physical Port 205
Virtual Port 206
207
Control Terminal 113
User Interface 111
Switching Device Peripheral Device(s) 120
CAC Reader 121
Other Slave Device 122

FIG. 2

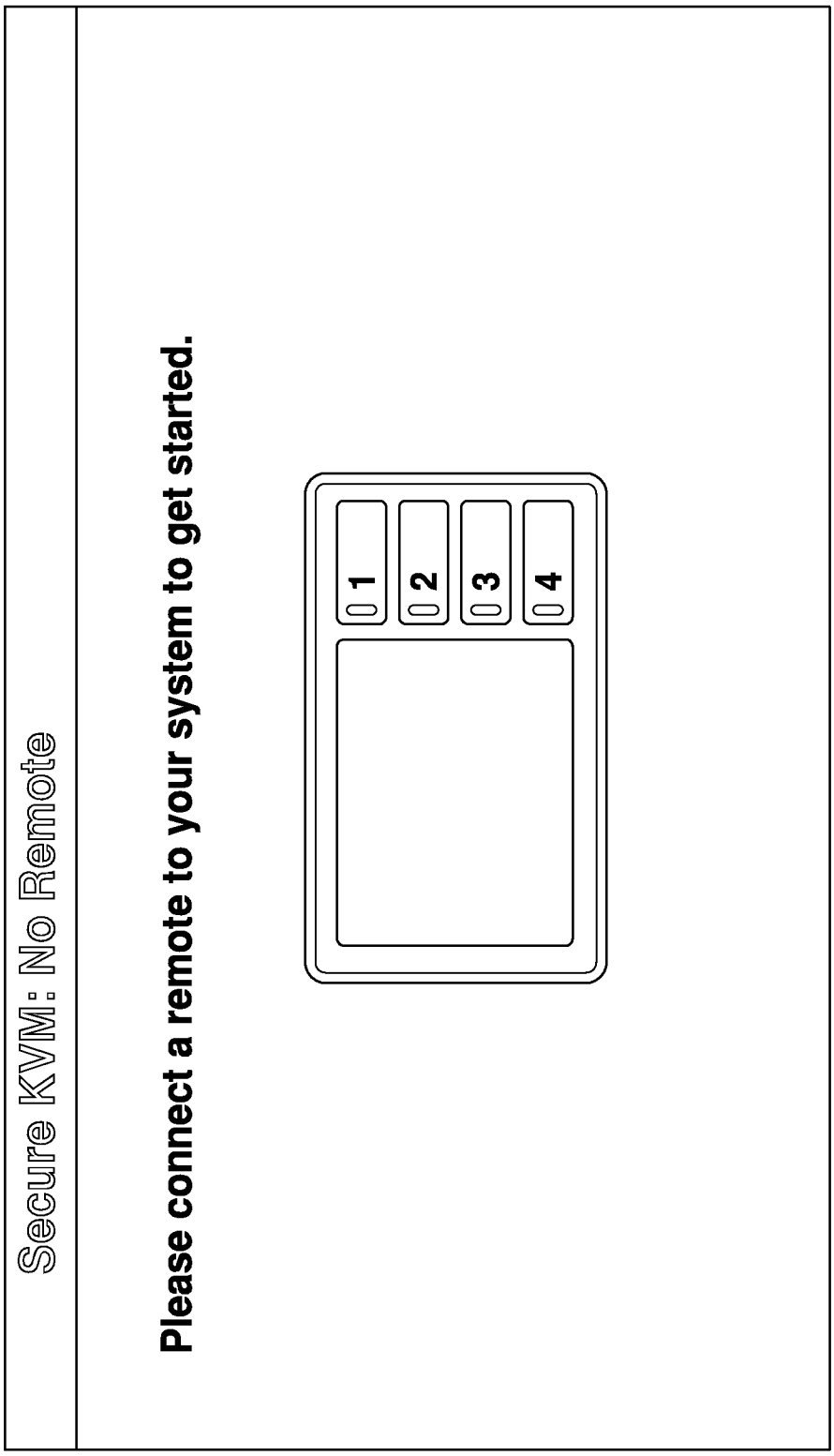

Secure KVM: No Remote
Please connect a remote to your system to get started.
1
2
3
4

FIG. 3

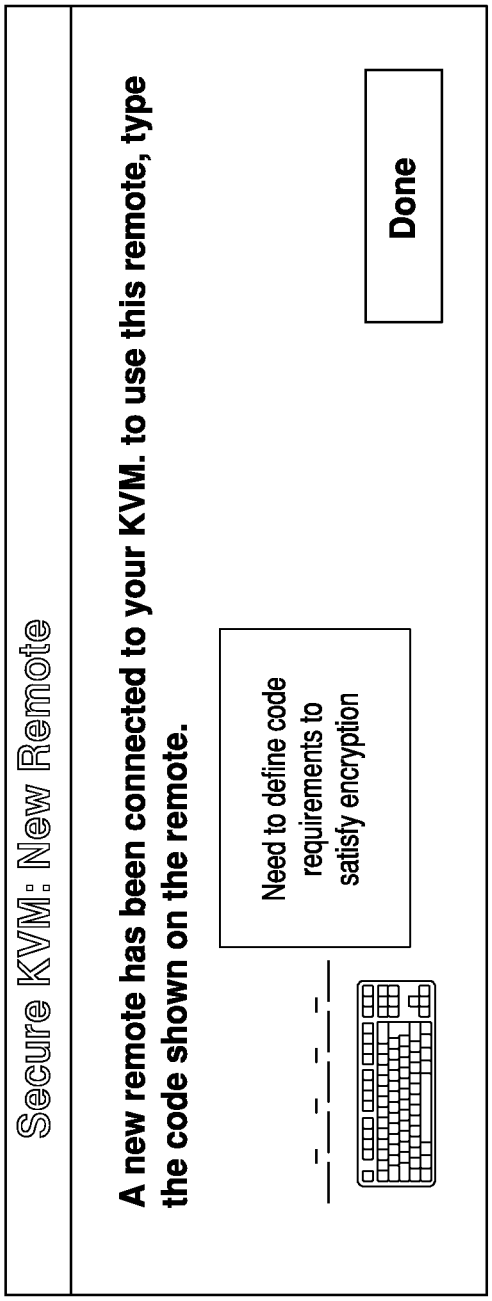

Secure KVM: New Remote
A new remote has been connected to your KVM. to use this remote, type the code shown on the remote.
Need to define code requirements to satisfy encryption
Done

FIG. 4

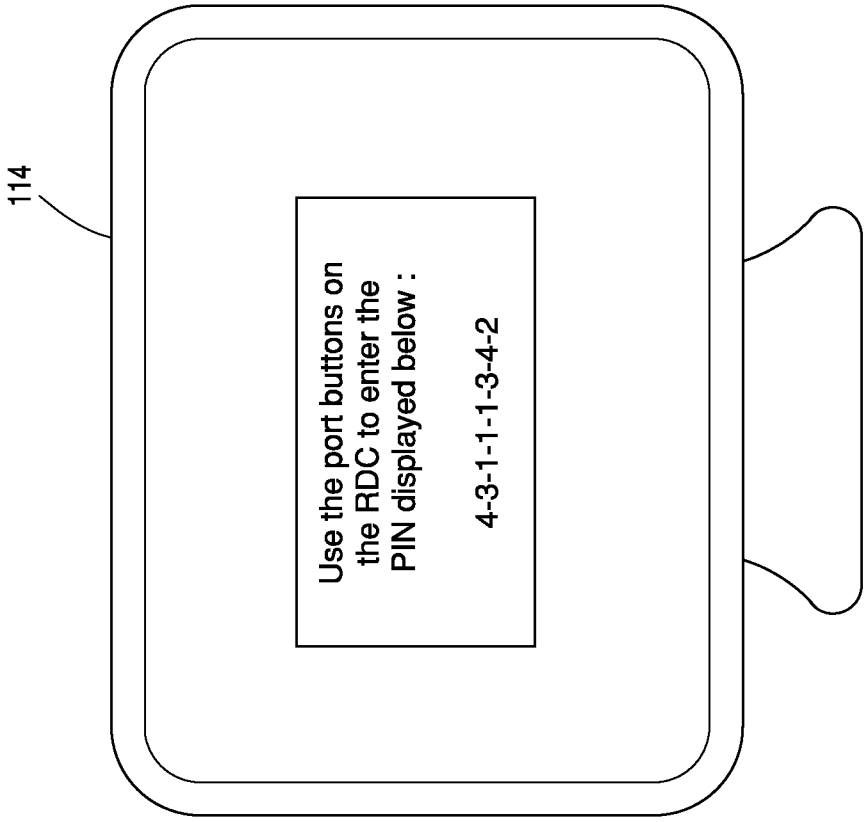

114
Use the port buttons on the RDC to enter the PIN displayed below :
4-3-1-1-1-3-4-2

FIG. 6

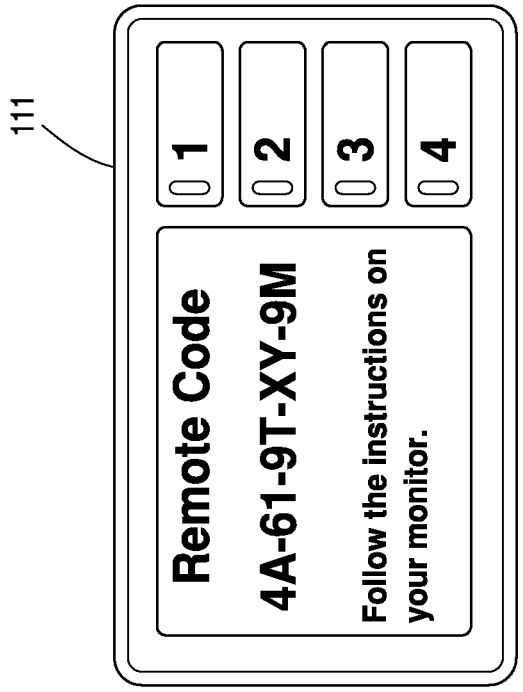

111
1
2
3
4
Remote Code
4A-61-9T-XY-9M
Follow the instructions on your monitor.

FIG. 5

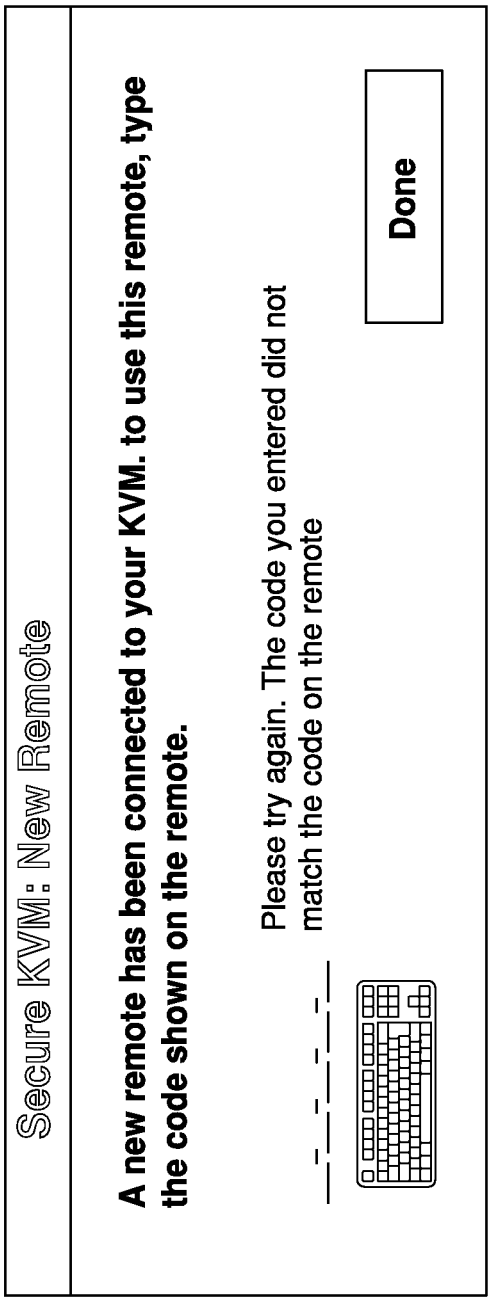

Secure KVM: New Remote
A new remote has been connected to your KVM. to use this remote, type the code shown on the remote.
Please try again. The code you entered did not match the code on the remote
Done

FIG. 7

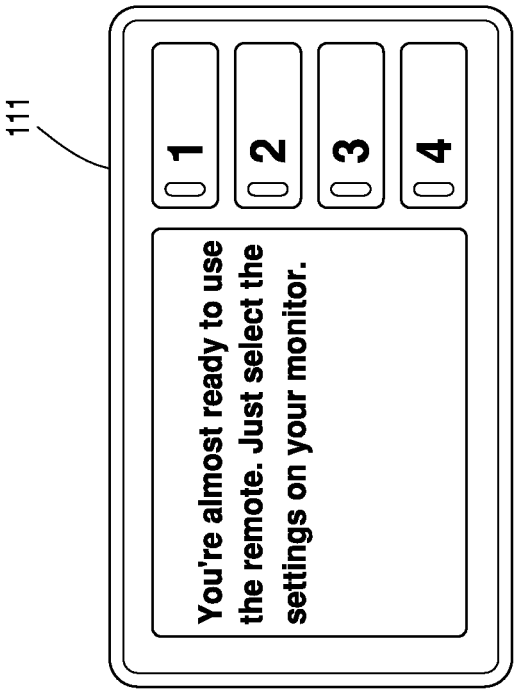

111
1
2
3
4
You're almost ready to use the remote. Just select the settings on your monitor.

FIG. 8

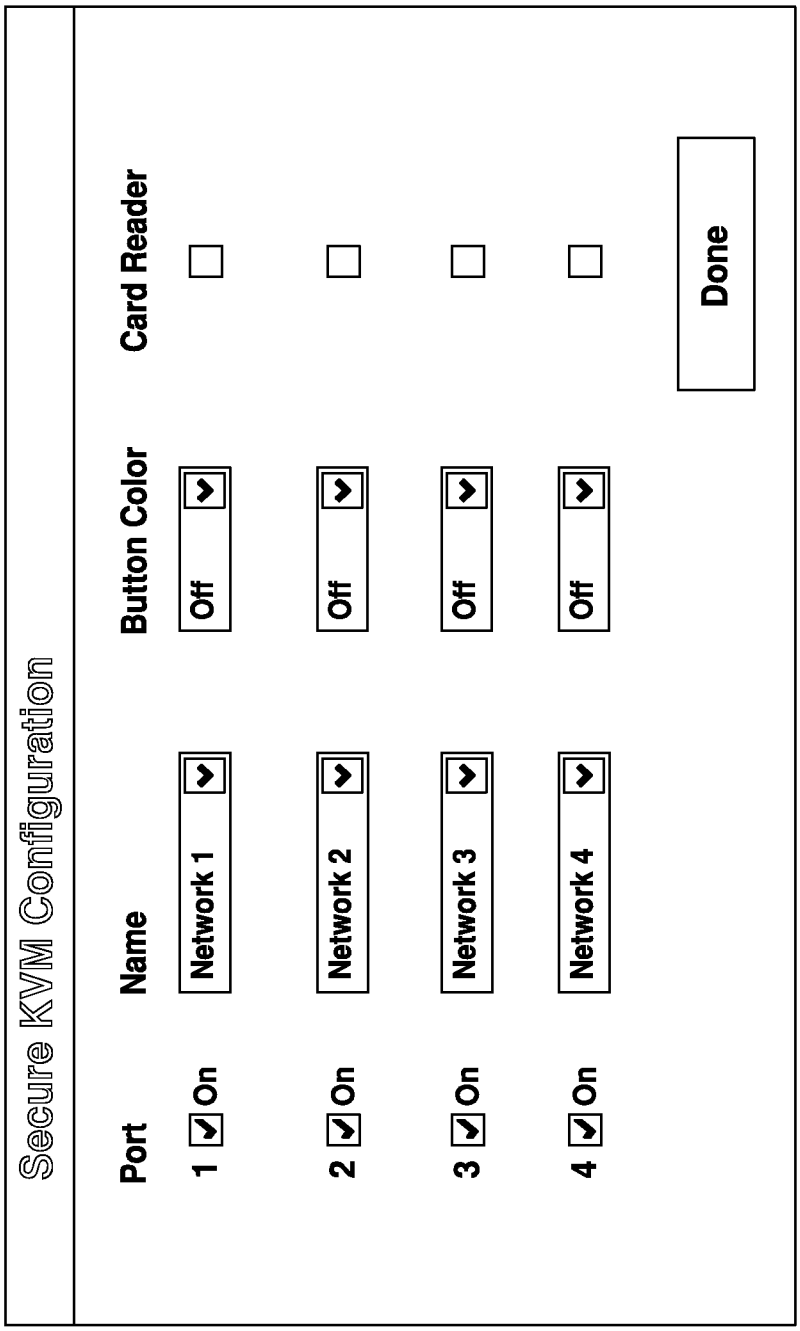

Secure KVM Configuration
Port
Name
Button Color
Card Reader
1 On
Network 1
Off
2 On
Network 2
Off
3 On
Network 3
Off
4 On
Network 4
Off
Done

FIG. 9

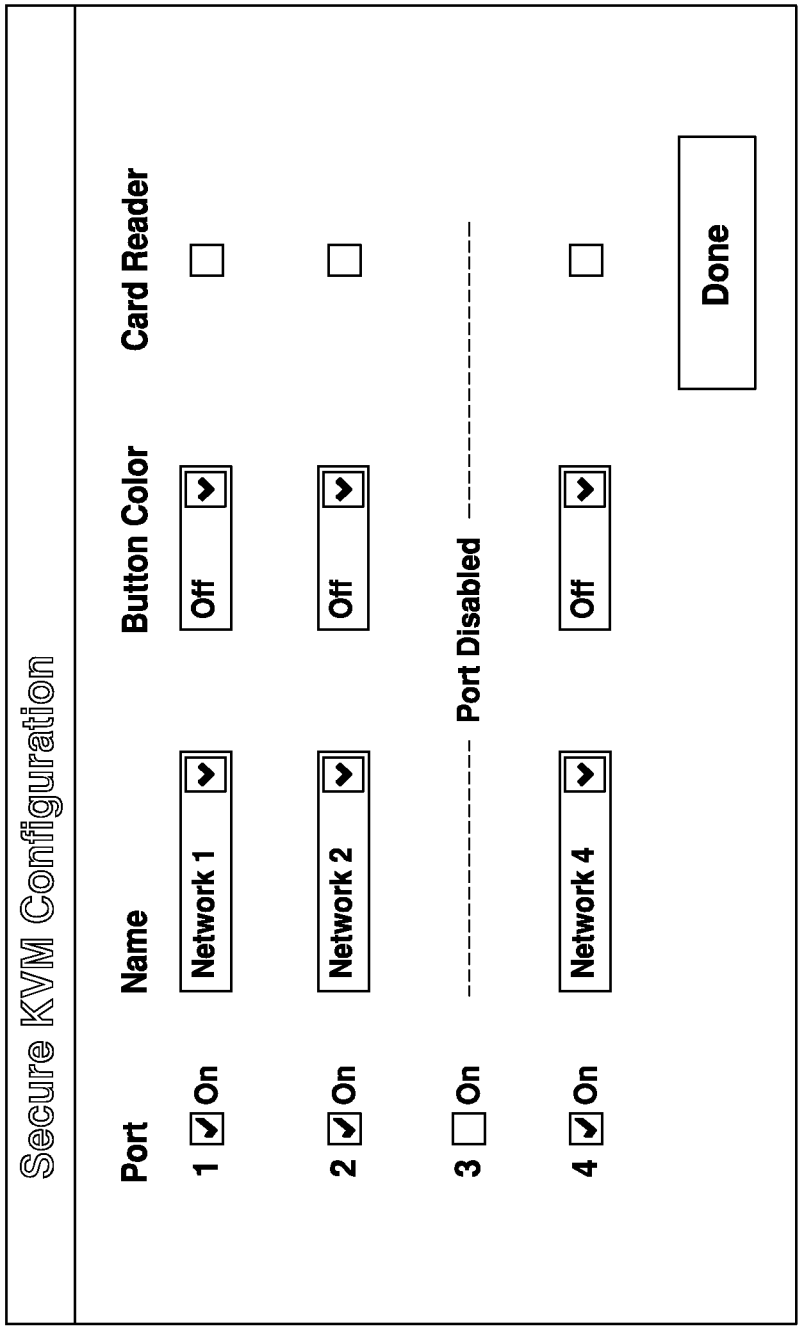

Secure KVM Configuration
Port
Name
Button Color
Card Reader
1 On
Network 1
Off
2 On
Network 2
Off
3 On
Port Disabled
4 On
Network 4
Off
Done

FIG. 10

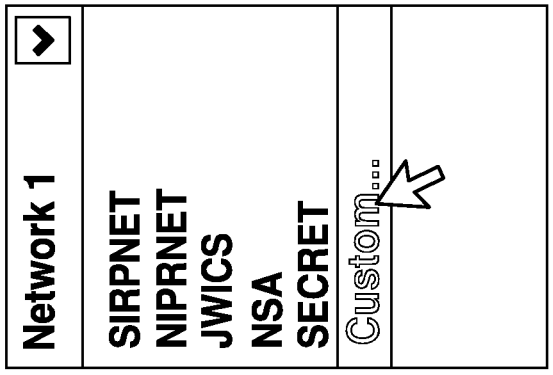


FIG. 11

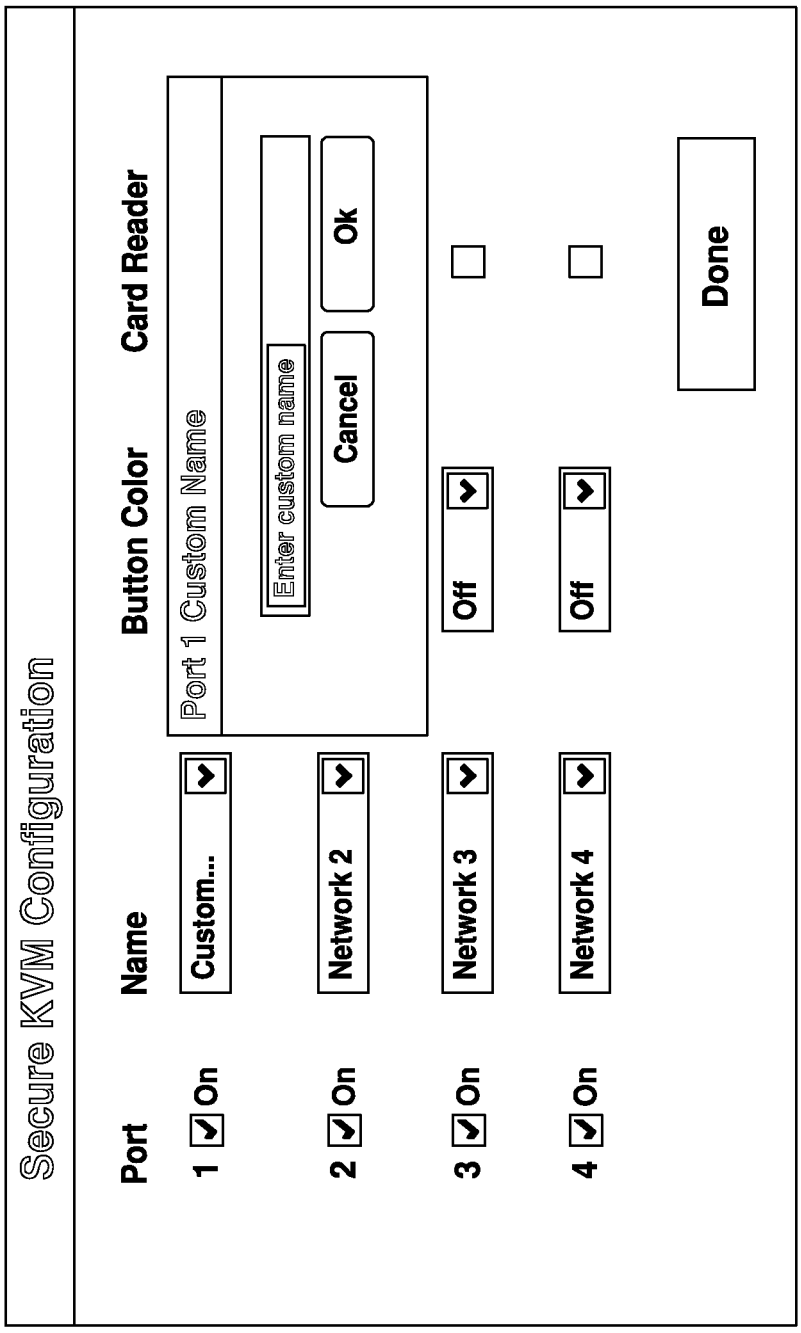

Secure KVM Configuration
Port
Name
Button Color
Card Reader
1 On
Custom...
2 On
Network 2
3 On
Network 3
Off
4 On
Network 4
Off
Port 1 Custom Name
Enter custom name
Cancel
Ok
Done

FIG. 12

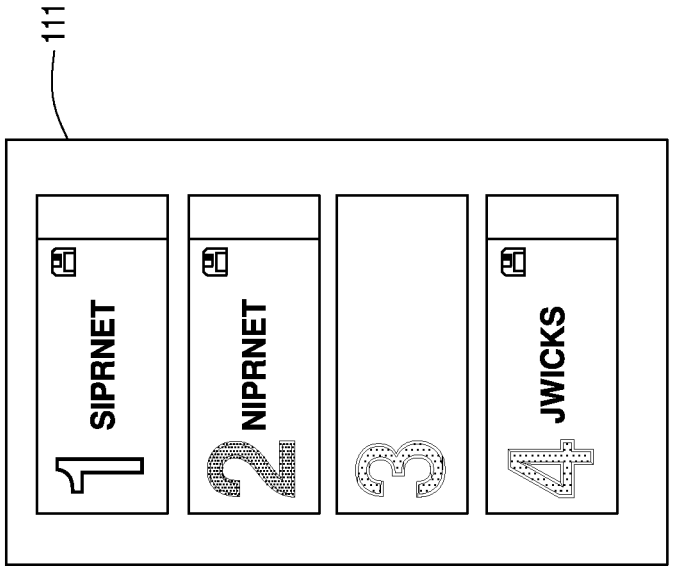

111
SIPRNET
NIPRNET
JWICKS
1
2
3
4

FIG. 14

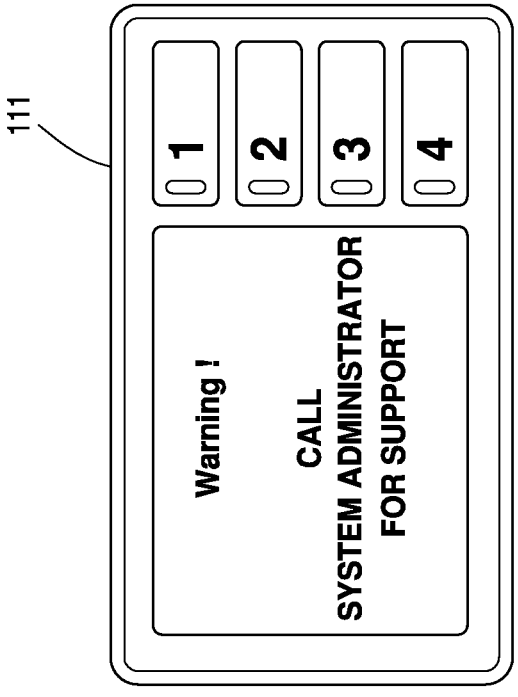

111
1
2
3
4
Warning !
CALL
SYSTEM ADMINISTRATOR
FOR SUPPORT

FIG. 13

FIG. 15

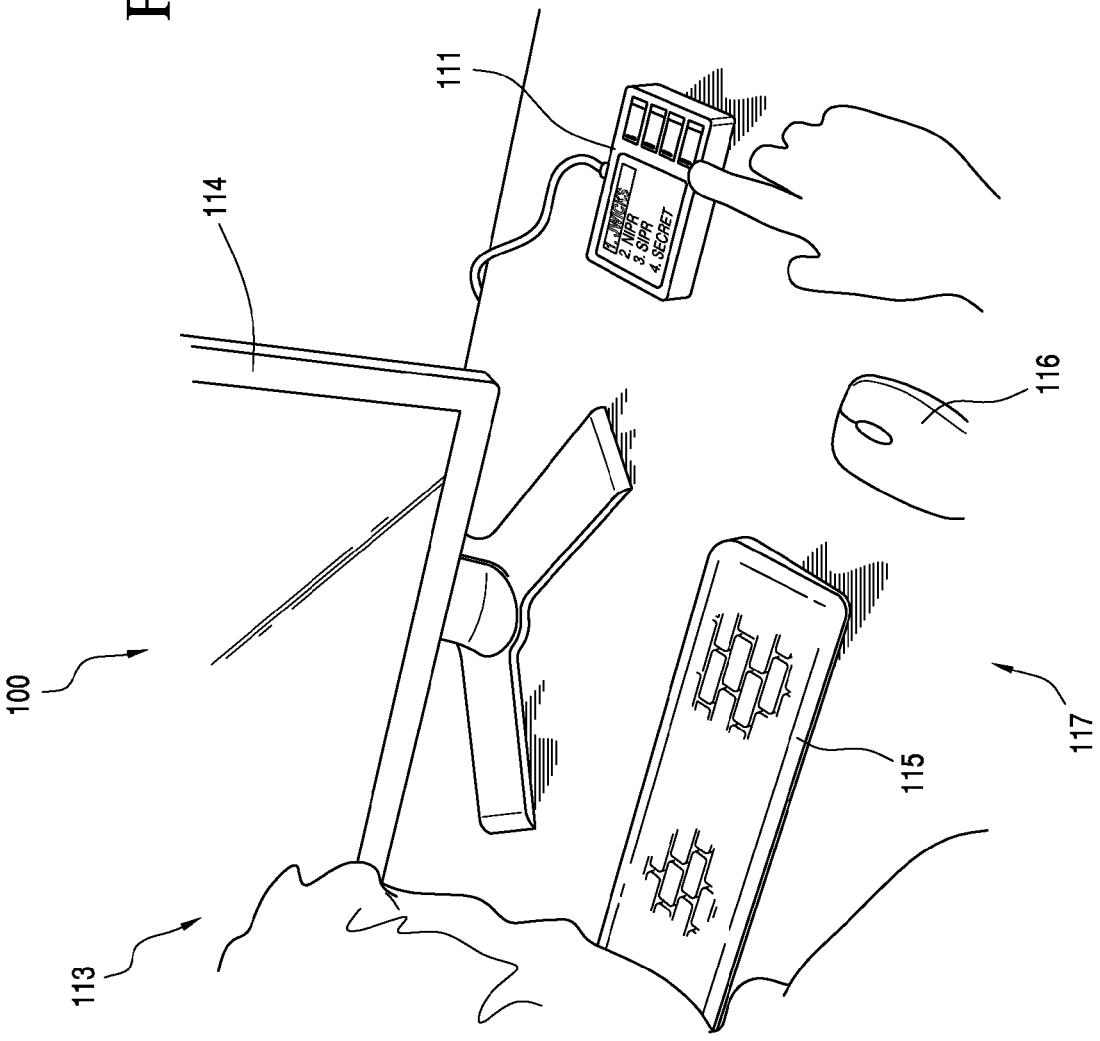


FIG. 16

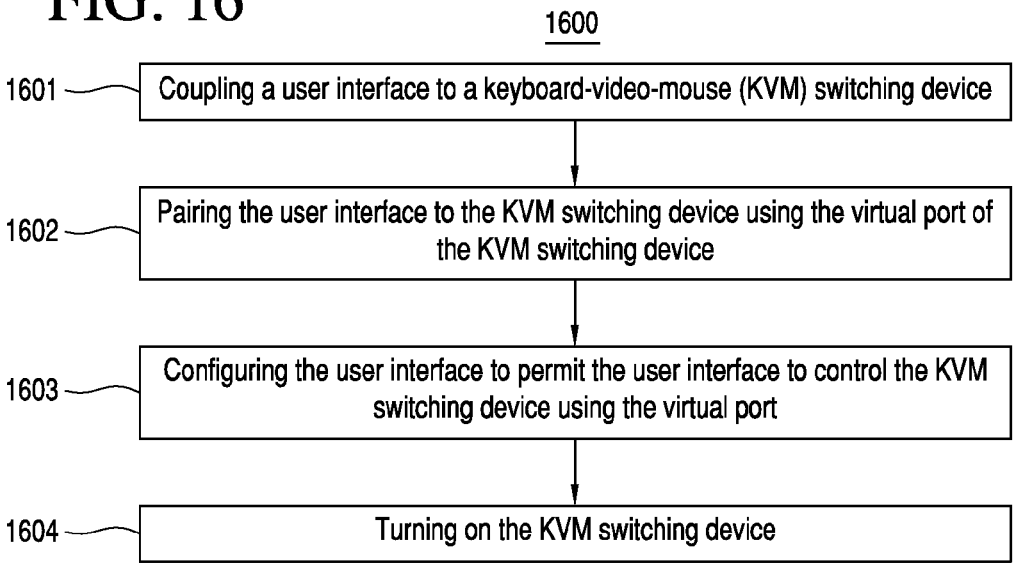

1600
1601
Coupling a user interface to a keyboard-video-mouse (KVM) switching device
1602
Pairing the user interface to the KVM switching device using the virtual port of the KVM switching device
1603
Configuring the user interface to permit the user interface to control the KVM switching device using the virtual port
1604
Turning on the KVM switching device

FIG. 17

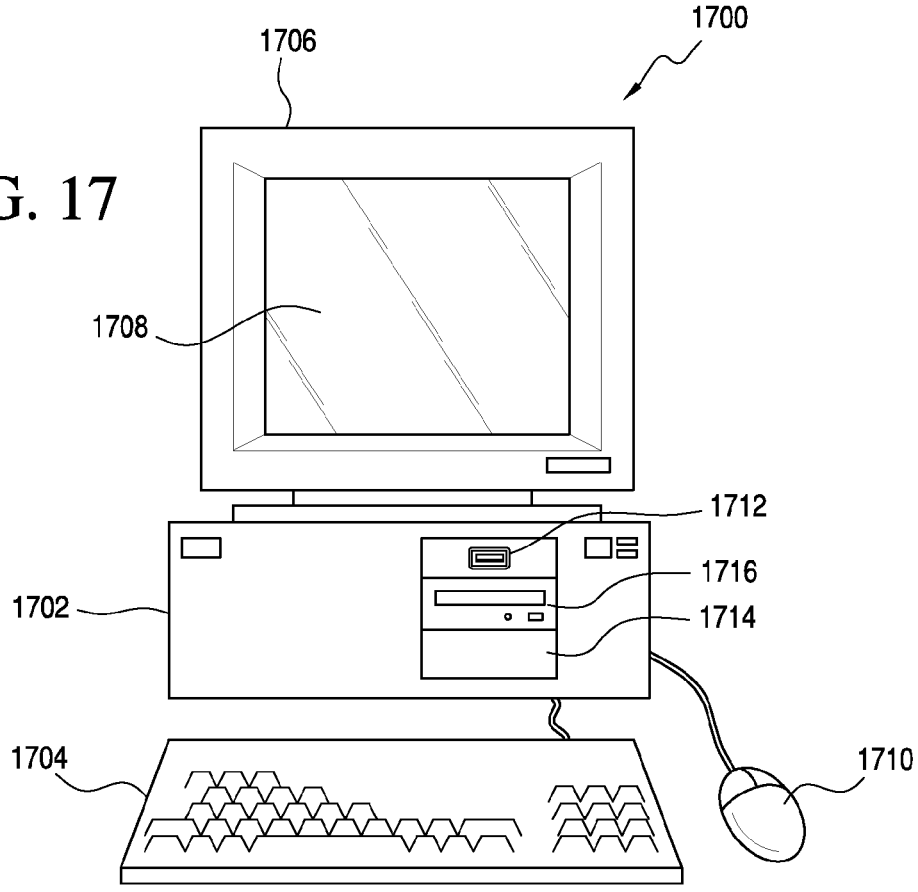
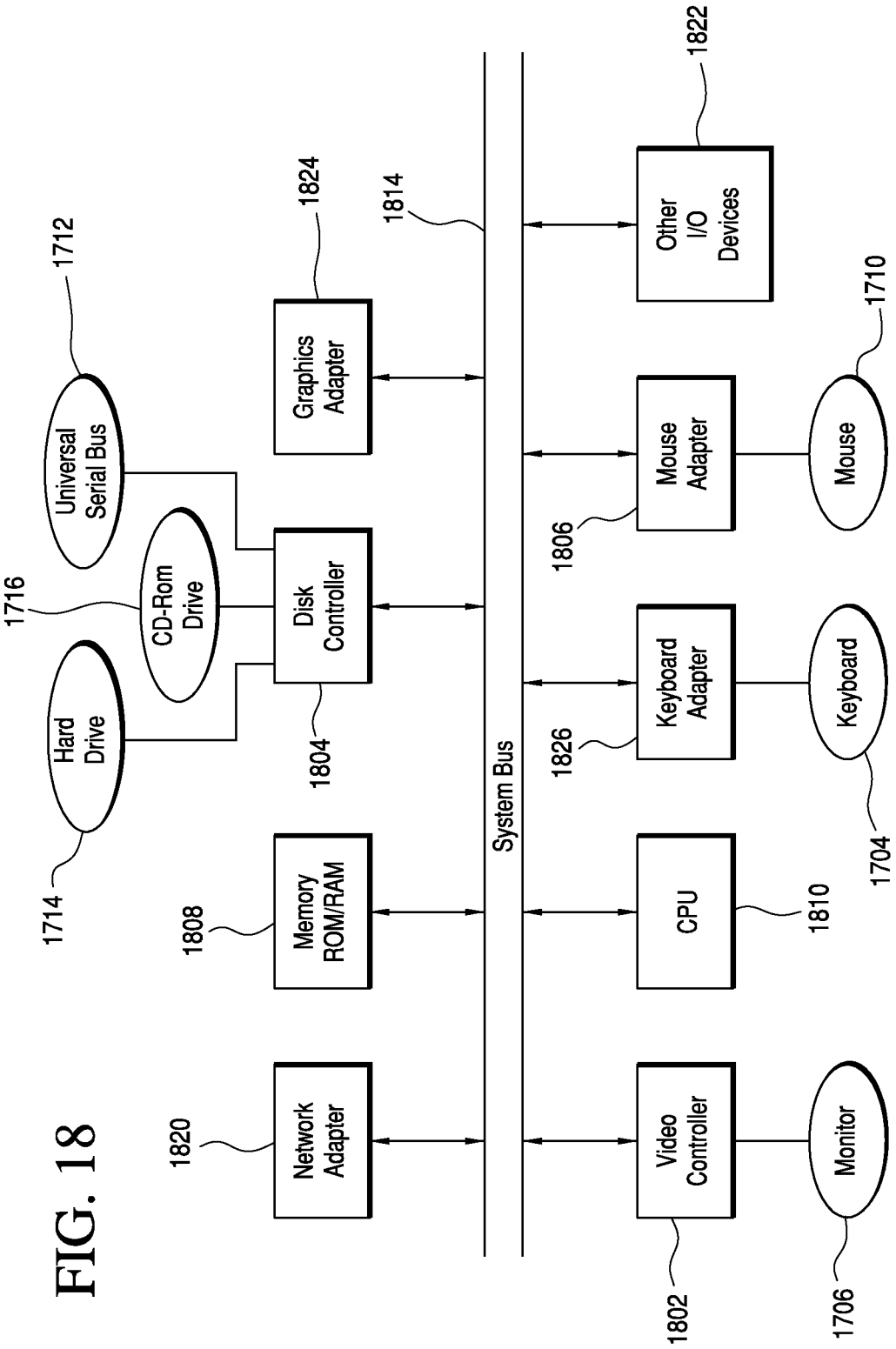

1700
1706
1708
1712
1716
1714
1702
1704
1710

FIG. 18


1822
Other I/O Devices
1814
1824
Graphics Adapter
1712
Universal Serial Bus
1716
CD-Rom Drive
Disk Controller
1804
Hard Drive
1714
1808
Memory ROM/RAM
1820
Network Adapter
System Bus
1806
Mouse Adapter
1710
Mouse
1826
Keyboard Adapter
Keyboard
1704
CPU
1810
1802
Video Controller
1706
Monitor

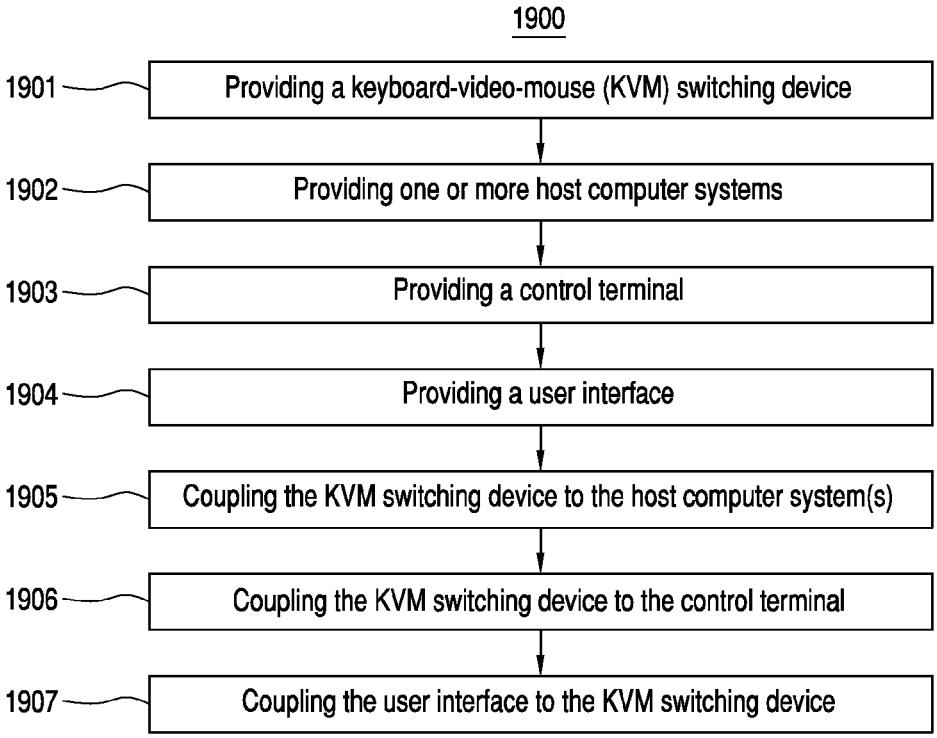

1900
1901
Providing a keyboard-video-mouse (KVM) switching device
1902
Providing one or more host computer systems
1903
Providing a control terminal
1904
Providing a user interface
1905
Coupling the KVM switching device to the host computer system(s)
1906
Coupling the KVM switching device to the control terminal
1907
Coupling the user interface to the KVM switching device

FIG. 19

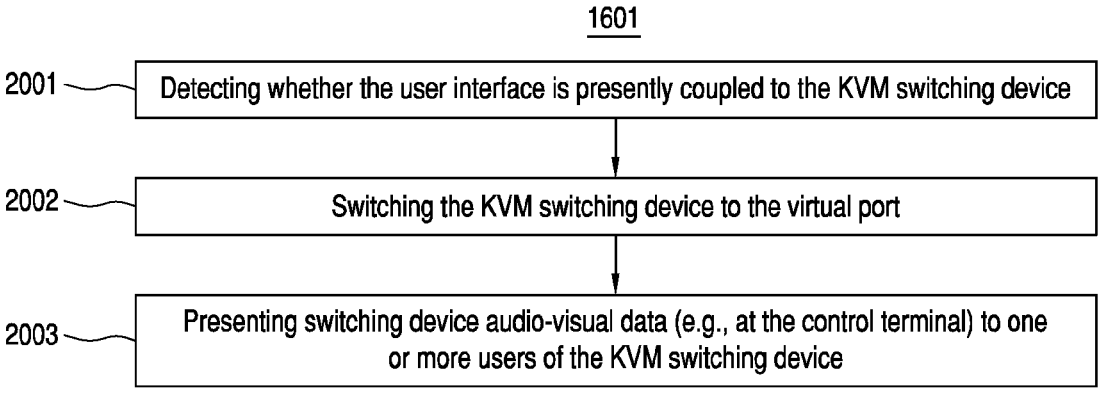

1601
2001
Detecting whether the user interface is presently coupled to the KVM switching device
2002
Switching the KVM switching device to the virtual port
2003
Presenting switching device audio-visual data (e.g., at the control terminal) to one or more users of the KVM switching device

FIG. 20

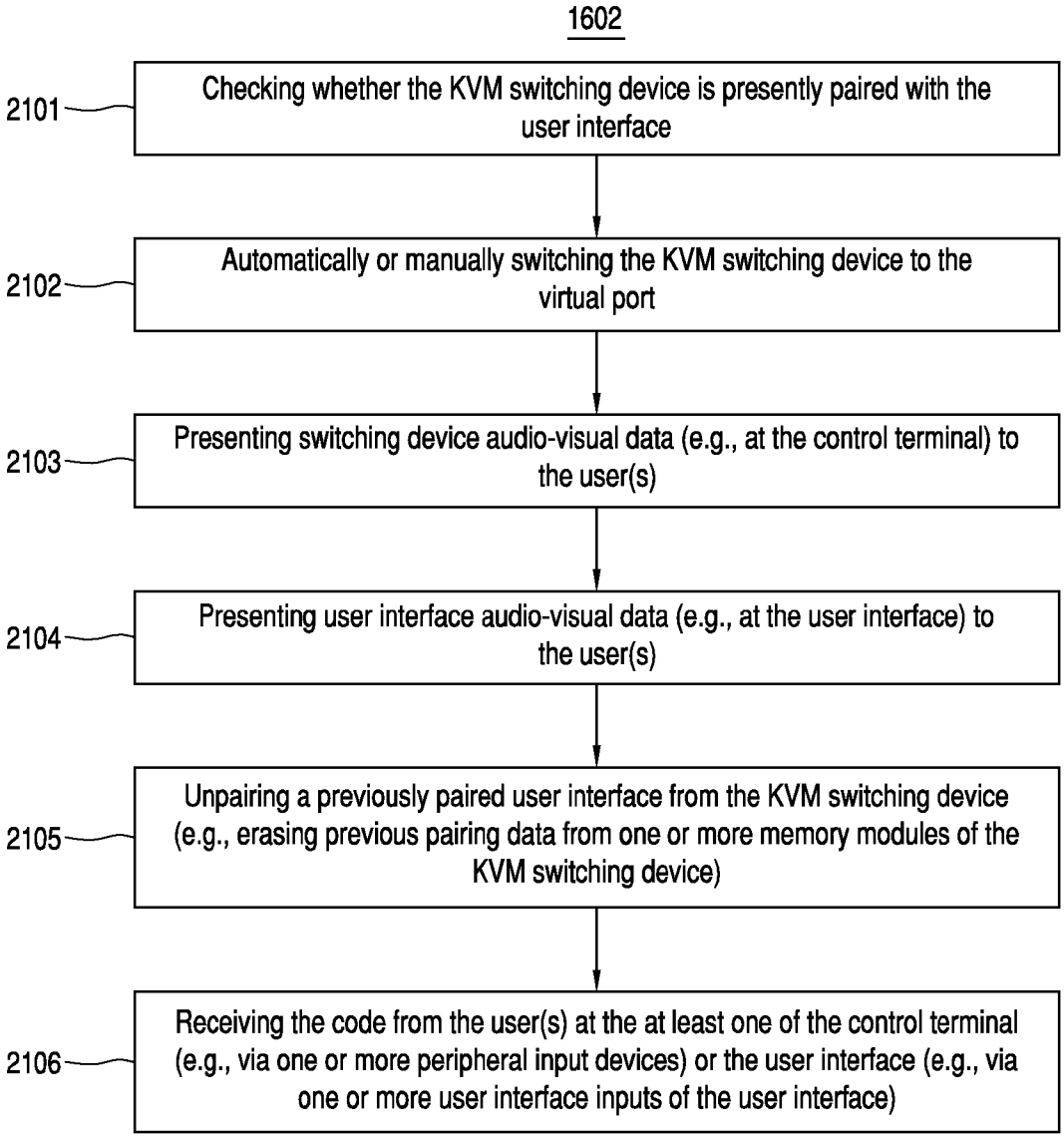

1602
2101
Checking whether the KVM switching device is presently paired with the user interface
2102
Automatically or manually switching the KVM switching device to the virtual port
2103
Presenting switching device audio-visual data (e.g., at the control terminal) to the user(s)
2104
Presenting user interface audio-visual data (e.g., at the user interface) to the user(s)
2105
Unpairing a previously paired user interface from the KVM switching device (e.g., erasing previous pairing data from one or more memory modules of the KVM switching device)
2106
Receiving the code from the user(s) at the at least one of the control terminal (e.g., via one or more peripheral input devices) or the user interface (e.g., via one or more user interface inputs of the user interface)

FIG. 21

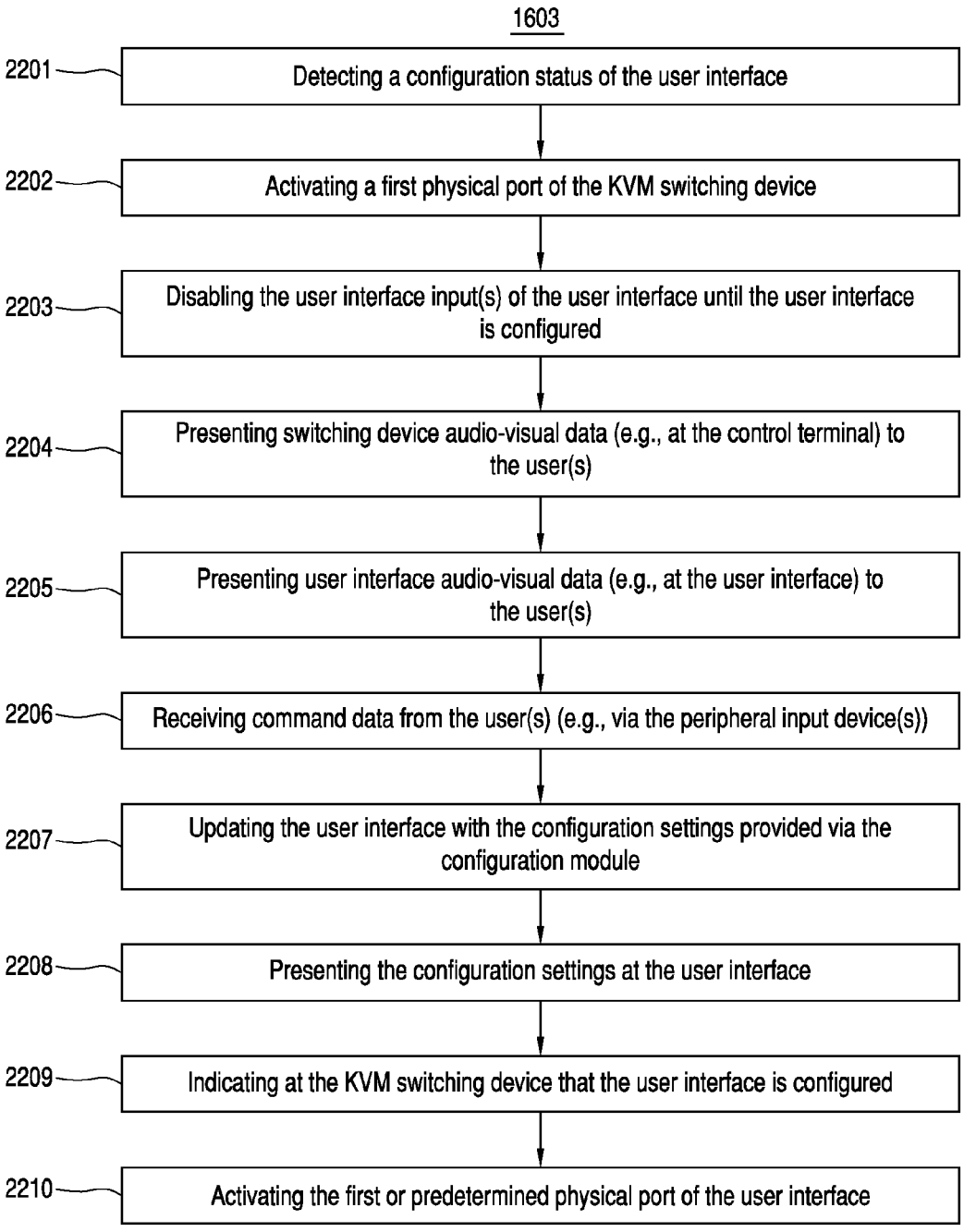

1603
2201
Detecting a configuration status of the user interface
2202
Activating a first physical port of the KVM switching device
2203
Disabling the user interface input(s) of the user interface until the user interface is configured
2204
Presenting switching device audio-visual data (e.g., at the control terminal) to the user(s)
2205
Presenting user interface audio-visual data (e.g., at the user interface) to the user(s)
2206
Receiving command data from the user(s) (e.g., via the peripheral input device(s))
2207
Updating the user interface with the configuration settings provided via the configuration module
2208
Presenting the configuration settings at the user interface
2209
Indicating at the KVM switching device that the user interface is configured
2210
Activating the first or predetermined physical port of the user interface

FIG. 22

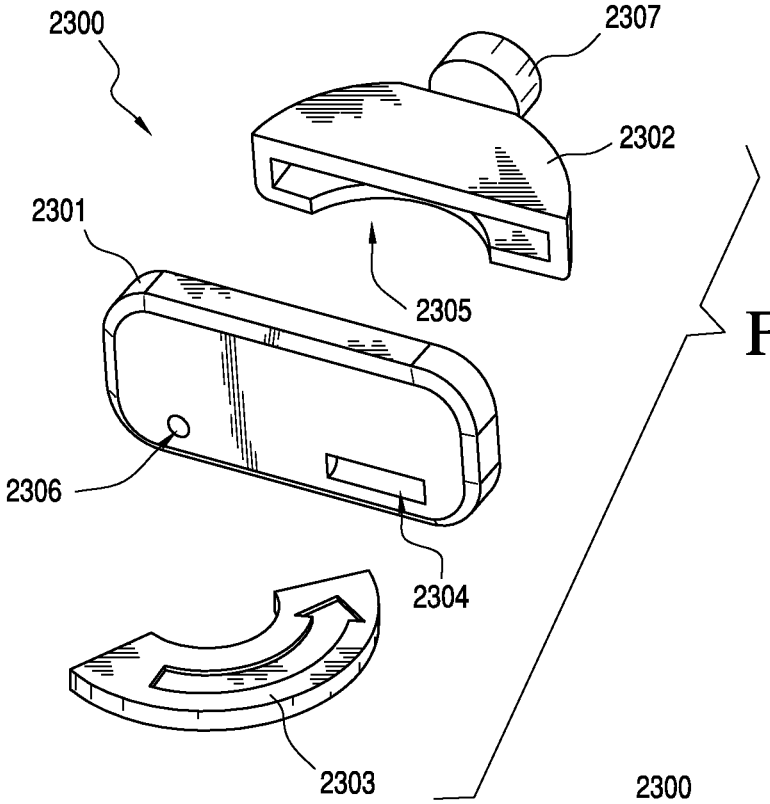


FIG. 23

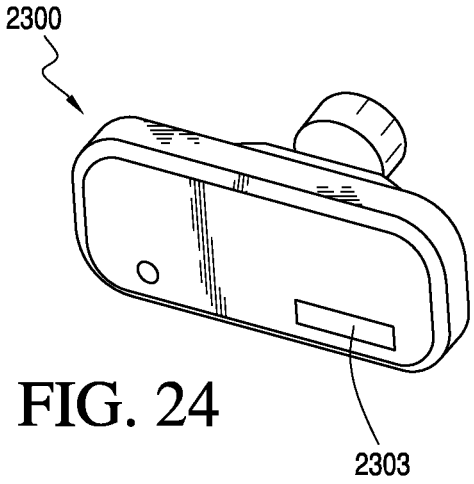


FIG. 24

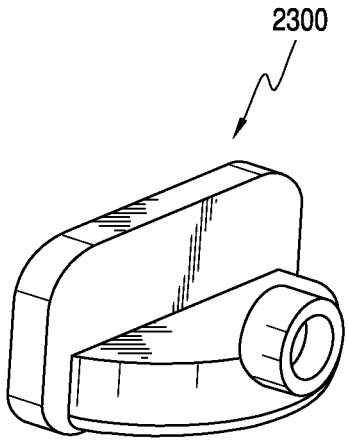


FIG. 25

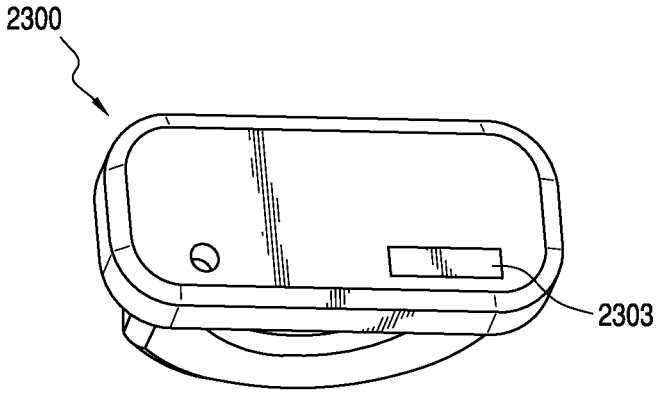


FIG. 26

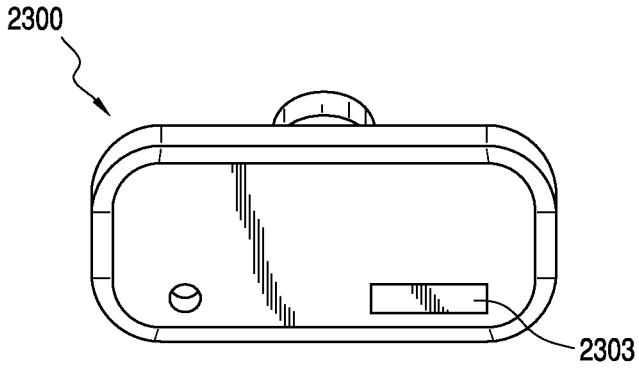


FIG. 27

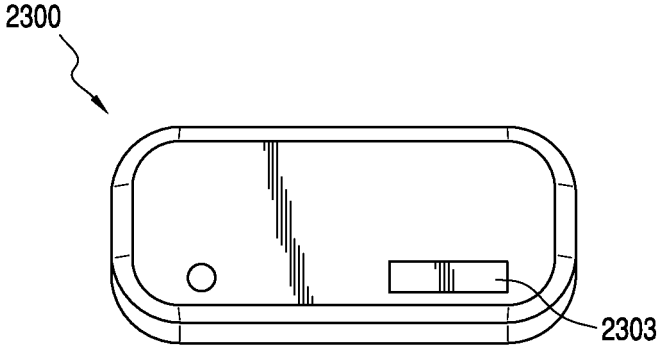


FIG. 28

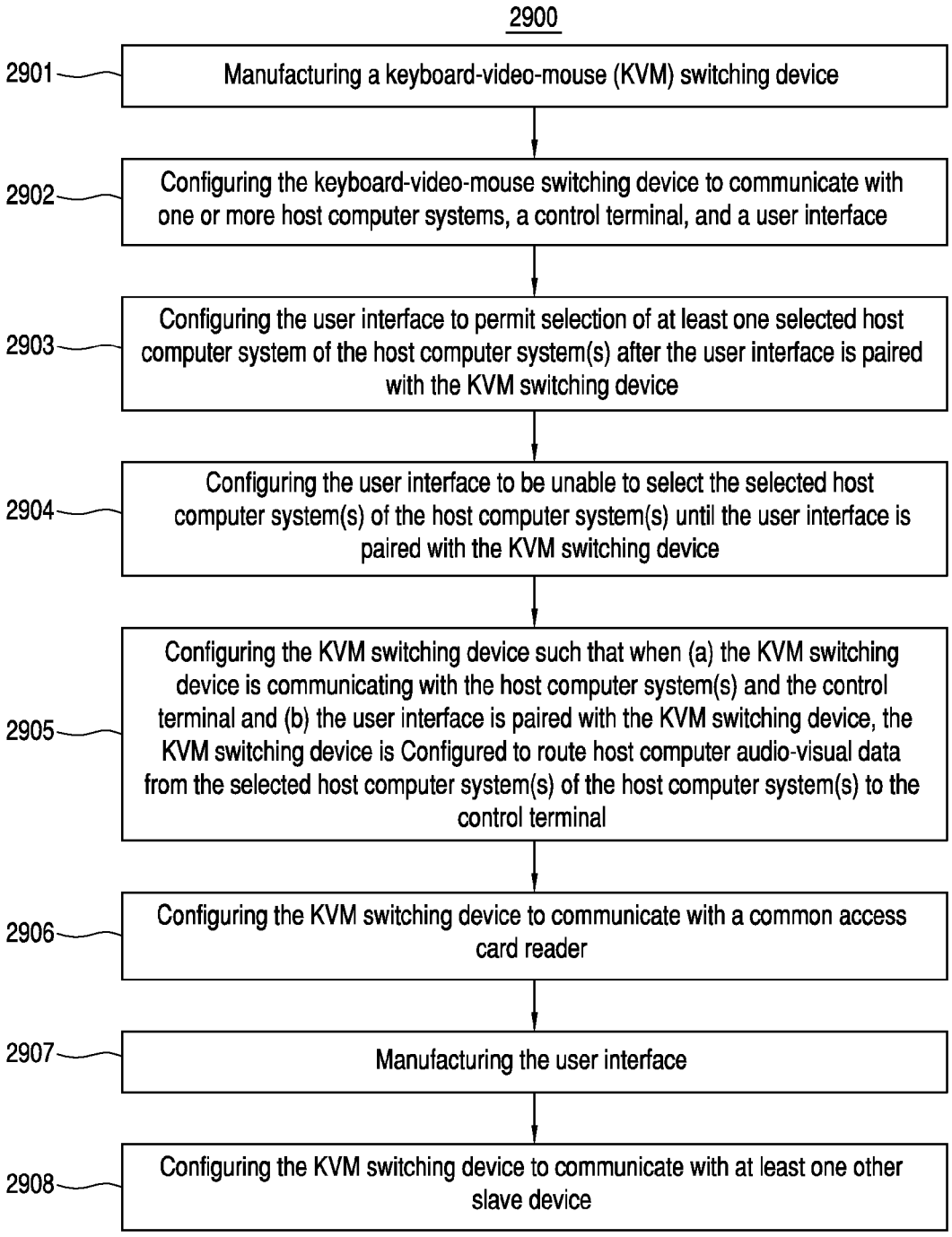

2900
2901
Manufacturing a keyboard-video-mouse (KVM) switching device
2902
Configuring the keyboard-video-mouse switching device to communicate with one or more host computer systems, a control terminal, and a user interface
2903
Configuring the user interface to permit selection of at least one selected host computer system of the host computer system(s) after the user interface is paired with the KVM switching device
2904
Configuring the user interface to be unable to select the selected host computer system(s) of the host computer system(s) until the user interface is paired with the KVM switching device
2905
Configuring the KVM switching device such that when (a) the KVM switching device is communicating with the host computer system(s) and the control terminal and (b) the user interface is paired with the KVM switching device, the KVM switching device is Configured to route host computer audio-visual data from the selected host computer system(s) of the host computer system(s) to the control terminal
2906
Configuring the KVM switching device to communicate with a common access card reader
2907
Manufacturing the user interface
2908
Configuring the KVM switching device to communicate with at least one other slave device

FIG. 29

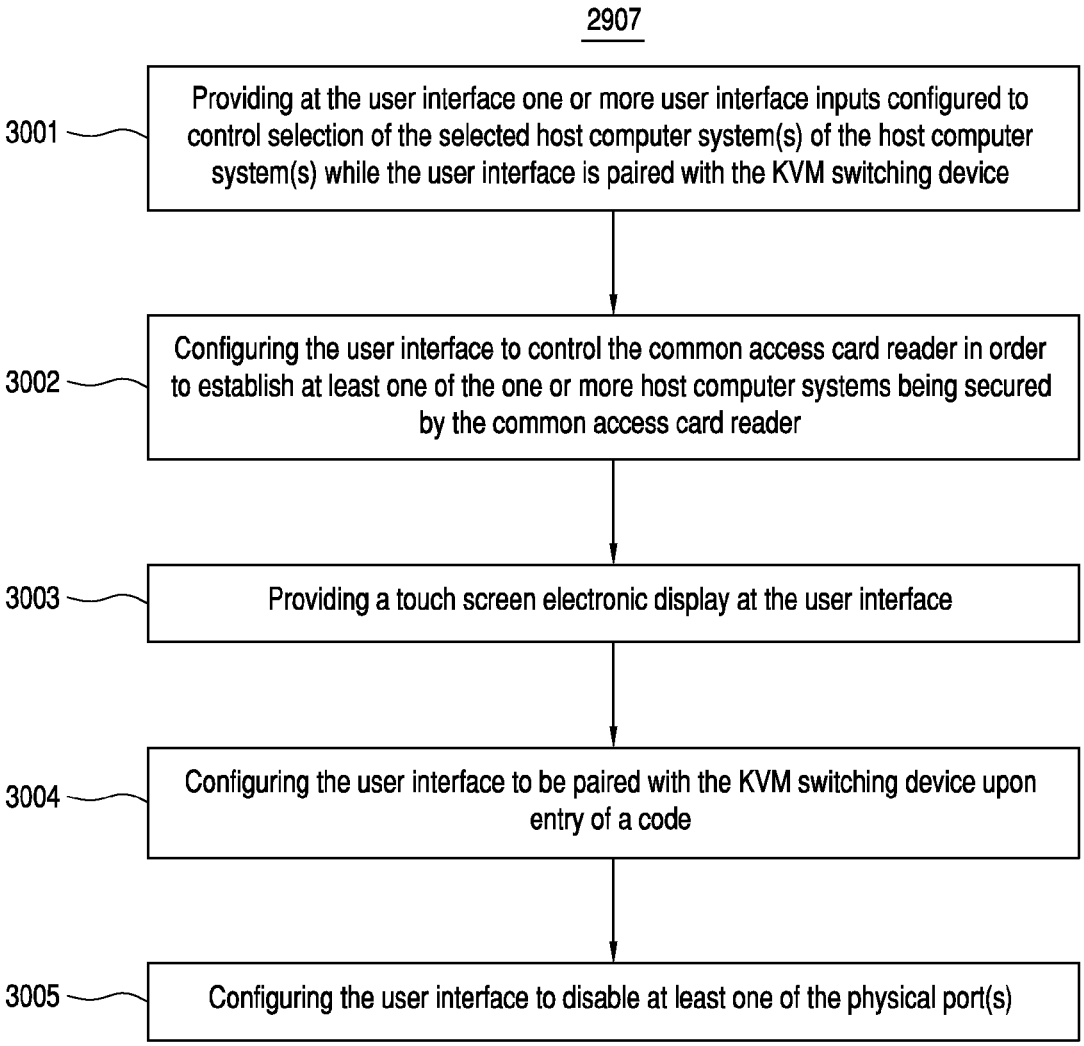

2907
3001
Providing at the user interface one or more user interface inputs configured to control selection of the selected host computer system(s) of the host computer system(s) while the user interface is paired with the KVM switching device
3002
Configuring the user interface to control the common access card reader in order to establish at least one of the one or more host computer systems being secured by the common access card reader
3003
Providing a touch screen electronic display at the user interface
3004
Configuring the user interface to be paired with the KVM switching device upon entry of a code
3005
Configuring the user interface to disable at least one of the physical port(s)

FIG. 30

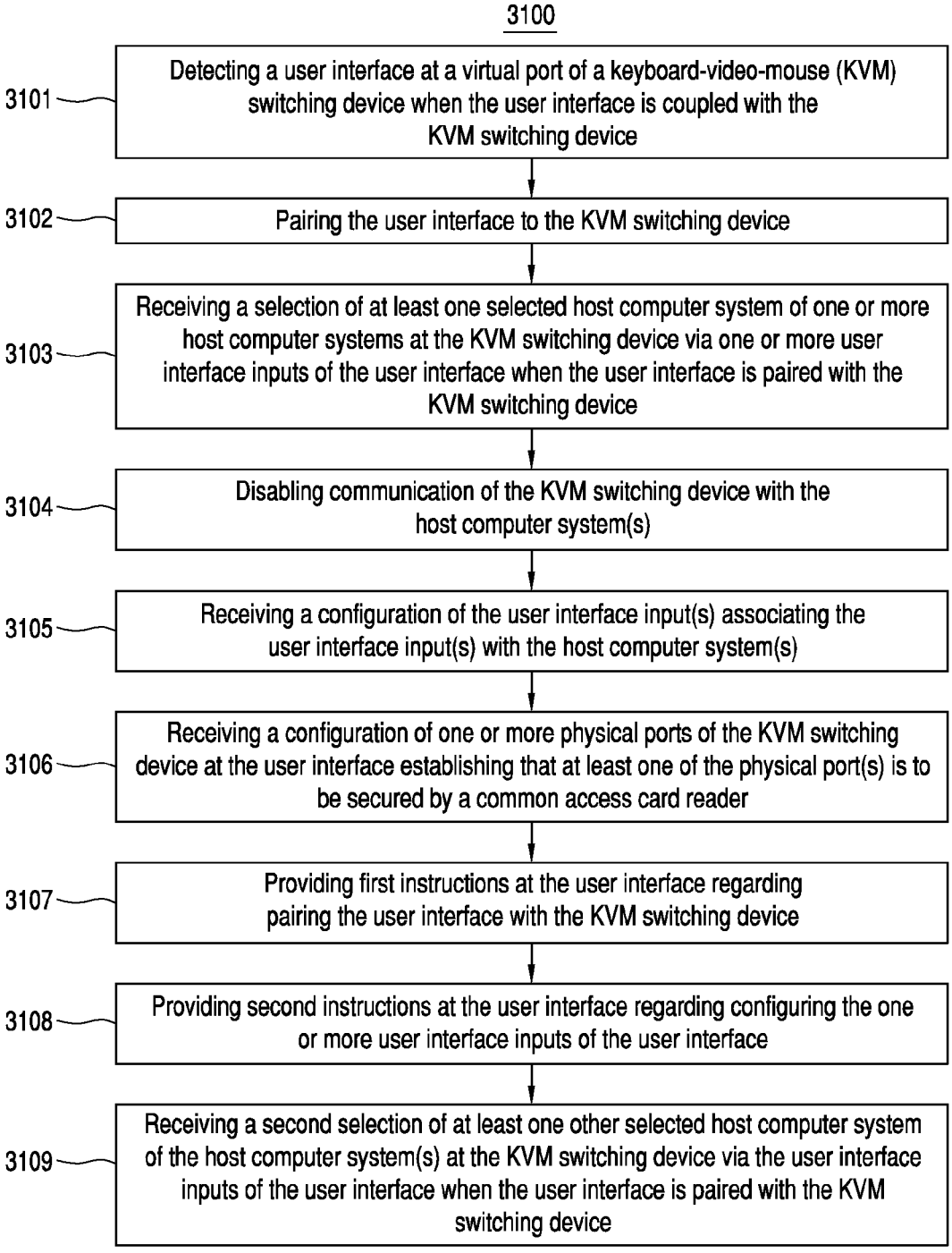

3100
3101
Detecting a user interface at a virtual port of a keyboard-video-mouse (KVM) switching device when the user interface is coupled with the KVM switching device
3102
Pairing the user interface to the KVM switching device
3103
Receiving a selection of at least one selected host computer system of one or more host computer systems at the KVM switching device via one or more user interface inputs of the user interface when the user interface is paired with the KVM switching device
3104
Disabling communication of the KVM switching device with the host computer system(s)
3105
Receiving a configuration of the user interface input(s) associating the user interface input(s) with the host computer system(s)
3106
Receiving a configuration of one or more physical ports of the KVM switching device at the user interface establishing that at least one of the physical port(s) is to be secured by a common access card reader
3107
Providing first instructions at the user interface regarding pairing the user interface with the KVM switching device
3108
Providing second instructions at the user interface regarding configuring the one or more user interface inputs of the user interface
3109
Receiving a second selection of at least one other selected host computer system of the host computer system(s) at the KVM switching device via the user interface inputs of the user interface when the user interface is paired with the KVM switching device

FIG. 31

KEYBOARD-VIDEO-MOUSE SYSTEM AND METHOD OF PROVIDING AND USING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of International Patent Application No. PCT/US2012/036656, filed May 4, 2012, and International Patent Application No. PCT/US2012/036663, filed May 4, 2012. International Patent Application No. PCT/US2012/036656 claims the benefit of U.S. Provisional Patent Application No. 61/482,850, filed May 5, 2011, and International Patent Application No. PCT/US2012/036663 claims the benefit of U.S. Provisional Patent Application No. 61/483,628, filed May 6, 2011. International Patent Application No. PCT/US2012/036656, International Patent Application No. PCT/US2012/036663, U.S. Provisional Patent Application No. 61/482,850, and U.S. Provisional Patent Application No. 61/483,628 are incorporated herein by reference in their entirety.

FIELD OF THE INVENTION

This invention relates generally to keyboard-video-mouse systems, and relates more particularly to such systems having virtual ports to configure user interfaces of the systems and methods of providing and using the same.

DESCRIPTION OF THE BACKGROUND

Keyboard-video-mouse systems (i.e., systems employing a keyboard-video-mouse (KVM) switching device) represent a class of switching systems designed to provide user(s) centralized control and monitoring of one or more host computers from a control terminal (e.g., keyboard, monitor and mouse). The control terminal is frequently located remotely from the host computers. Through the KVM switching device, the user(s) can select and switch between the one or more host computers to operate the one or more host computers with the control terminal. The KVM switching device routes audio-visual data of the selected host computer to the control terminal so that the user(s) may view and/or listen to the audio-visual data at the control terminal. The KVM switching device also routes the signals from peripheral input devices of the control terminal (e.g., a keyboard and/or a mouse of the control terminal) to the respective peripheral input device ports of the selected host computer. From the host computer's perspective, it appears as if the control terminal's peripheral input devices are directly coupled to the host computer. The user(s) may select which host computer to operate from the control terminal with a user interface of the KVM system that is configured to control the KVM switching device.

Accordingly, a need or potential for benefit exists for an apparatus or system that can permit a user to pair a user interface with a KVM switching device and/or to configure the user interface to permit the user interface to control the KVM switching device.

BRIEF DESCRIPTION OF THE DRAWINGS

To facilitate further description of the embodiments, the following drawings are provided in which:

FIG. **1** illustrates a system, according to one embodiment;

FIG. **2** is a block diagram illustrating the embodiment of the system of FIG. **1**;

FIG. **3** illustrates exemplary switching device audio-visual data instructing one or more user(s) to couple a user interface to a KVM switching device, according to the embodiment of FIG. **1**;

FIG. **4** illustrates exemplary switching device audio-visual data instructing the user(s) to provide a code presented at the user interface, according to the embodiment of FIG. **1**;

FIG. **5** illustrates exemplary user interface audio-visual data comprising the code presented at the user interface, according to the embodiment of FIG. **1**;

FIG. **6** illustrates the user(s) providing the code to a control terminal via one or more user interface input(s), according to the embodiment of FIG. **1**;

FIG. **7** illustrates exemplary switching device audio-visual data notifying the user(s) that the code has been incorrectly entered and needs to be entered again, according to the embodiment of FIG. **1**;

FIG. **8** illustrates exemplary user interface audio-visual data notifying the user(s) that the user interface is nearly ready for use and to configure the user interface at the control terminal, according to the embodiment of FIG. **1**;

FIG. **9** illustrates an exemplary configuration module, which can be a type of switching device audio-visual data, according to the embodiment of FIG. **1**;

FIG. **10** illustrates the exemplary configuration module of FIG. **9** where a physical port has been disabled;

FIG. **11** illustrates an exemplary drop down list of the configuration module of FIG. **9** where the user(s) can select to customize the name of a physical port;

FIG. **12** illustrates an exemplary customization window of the configuration module of FIG. **9** whereby the user(s) can customize the name of a physical port;

FIG. **13** illustrates exemplary user interface audio-visual data notifying the user(s) to contact the administrator and/or the manufacturer, according to the embodiment of FIG. **1**;

FIG. **14** illustrates an exemplary user interface audio-visual data and/or exemplary user interface input(s) of the user interface, according to the embodiment of FIG. **1**;

FIG. **15** illustrates the exemplary system of FIG. **1** being used by the user(s);

FIG. **16** illustrates a flow chart for an embodiment of a method;

FIG. **17** illustrates a computer that is suitable for implementing an embodiment of a computer system of FIG. **1** and/or of the virtual port of FIG. **2**;

FIG. **18** illustrates a representative block diagram of an example of elements included in circuit boards inside a chassis of the computer system or virtual port of FIG. **17**;

FIG. **19** illustrates a flow chart for an embodiment of another method;

FIG. **20** illustrates an exemplary procedure of coupling a user interface to a keyboard-video-mouse (KVM) switching device;

FIG. **21** illustrates an exemplary procedure of pairing the user interface to the KVM switching device using a virtual port of the KVM switching device, according to the embodiment of FIG. **16**;

FIG. **22** illustrates an exemplary procedure of configuring the user interface to permit the user interface to control the KVM switching device using the virtual port, according to the embodiment of FIG. **16**;

FIG. **23** illustrates an exploded view of an exemplary a user input implemented as a mechanical button, according to an embodiment;

FIG. **24** shows a front, right, top isometric view of the user input of the embodiment of FIG. **23**;

FIG. **25** shows a rear, right, top isometric view of the user input of the embodiment of FIG. **23**;

FIG. **26** shows a front, bottom isometric view of the user input of the embodiment of FIG. **23**;

FIG. **27** shows a front, top isometric view of the user input of the embodiment of FIG. **23**;

FIG. **28** shows a front view of the user input of the embodiment of FIG. **23**;

FIG. **29** illustrates a flow chart for an embodiment of a method;

FIG. **30** illustrates an exemplary activity of manufacturing a user interface, according to the embodiment of FIG. **29**; and

FIG. **31** illustrates a flow chart for an embodiment of a method.

For simplicity and clarity of illustration, the drawing figures illustrate the general manner of construction, and descriptions and details of well-known features and techniques may be omitted to avoid unnecessarily obscuring the invention. Additionally, elements in the drawing figures are not necessarily drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help improve understanding of embodiments of the present invention. The same reference numerals in different figures denote the same elements.

The terms "first," "second," "third," "fourth," and the like in the description and in the claims, if any, are used for distinguishing between similar elements and not necessarily for describing a particular sequential or chronological order. It is to be understood that the terms so used are interchangeable under appropriate circumstances such that the embodiments described herein are, for example, capable of operation in sequences other than those illustrated or otherwise described herein. Furthermore, the terms "include," and "have," and any variations thereof, are intended to cover a non-exclusive inclusion, such that a process, method, system, article, device, or apparatus that comprises a list of elements is not necessarily limited to those elements, but may include other elements not expressly listed or inherent to such process, method, system, article, device, or apparatus.

The terms "left," "right," "front," "back," "top," "bottom," "over," "under," and the like in the description and in the claims, if any, are used for descriptive purposes and not necessarily for describing permanent relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances such that the embodiments of the invention described herein are, for example, capable of operation in other orientations than those illustrated or otherwise described herein.

The terms "couple," "coupled," "couples," "coupling," and the like should be broadly understood and refer to connecting two or more elements or signals, electrically, mechanically and/or otherwise. Two or more electrical elements may be electrically coupled together, but not be mechanically or otherwise coupled together; two or more mechanical elements may be mechanically coupled together, but not be electrically or otherwise coupled together; two or more electrical elements may be mechanically coupled together, but not be electrically or otherwise coupled together. Coupling may be for any length of time, e.g., permanent or semi-permanent or only for an instant.

"Electrical coupling" and the like should be broadly understood and include coupling involving any electrical signal, whether a power signal, a data signal, and/or other types or combinations of electrical signals. "Mechanical coupling" and the like should be broadly understood and include mechanical coupling of all types.

The absence of the word "removably," "removable," and the like near the word "coupled," and the like does not mean that the coupling, etc. in question is or is not removable.

DETAILED DESCRIPTION OF EXAMPLES OF EMBODIMENTS

Some embodiment include a system. The system comprises a keyboard-video-mouse switching device. The keyboard-video-mouse switching device is configured to communicate with one or more host computer systems, a control terminal, and a user interface. The keyboard-video-mouse switching device can comprise a virtual port through which the user interface communicates with the keyboard-video-mouse switching device and one or more physical ports through which the one or more host computer systems communicate with the keyboard-video-mouse switching device. Further, the user interface can be configured to permit selection of at least one selected host computer system of the one or more host computer systems after the user interface is paired with the keyboard-video-mouse switching device. However, the user interface can be unable to select the at least one selected host computer system of the one or more host computer systems until the user interface is paired with the keyboard-video-mouse switching device. Meanwhile, when the keyboard-video-mouse switching device is communicating with the one or more host computer systems and the control terminal and when the user interface is paired with the keyboard-video-mouse switching device, the keyboard-video-mouse switching device is configured to route host computer audio-visual data from the at least one selected host computer system of the one or more host computer systems to the control terminal.

Various embodiments include a method. The method can comprise: manufacturing a keyboard-video-mouse switching device comprising a virtual port and one or more physical ports; configuring the keyboard-video-mouse switching device to communicate with one or more host computer systems, a control terminal, and a user interface, the keyboard-video-mouse switching device being configured to communicate with the user interface through the virtual port and to communicate with the one or more host computer systems through the one or more physical ports; configuring the user interface to permit selection of at least one selected host computer system of the one or more host computer systems after the user interface is paired with the keyboard-video-mouse switching device; configuring the user interface to be unable to select the at least one selected host computer system of the one or more host computer systems until the user interface is paired with the keyboard-video-mouse switching device; and configuring the keyboard-video-mouse switching device such that when (a) the keyboard-video-mouse switching device is communicating with the one or more host computer systems and the control terminal and (b) the user interface is paired with the keyboard-video-mouse switching device, the keyboard-video-mouse switching device is configured to route host computer audio-visual data from the at least one selected host computer system of the one or more host computer systems to the control terminal.

Further embodiments include a method. The method can comprise: detecting a user interface at a virtual port of a keyboard-video-mouse switching device when the user interface is coupled with the keyboard-video-mouse switching device, the keyboard-video-mouse switching device being configured to communicate with one or more host computer systems, a control terminal, and the user interface; pairing the user interface to the keyboard-video-mouse switching device;

and receiving a selection of at least one selected host computer system of the one or more host computer systems at the keyboard-video-mouse switching device via one or more user interface inputs of the user interface when the user interface is paired with the keyboard-video-mouse switching device.

Turning to the drawings, FIG. **1** illustrates system **100**, according to one embodiment. System **100** is merely exemplary and is not limited to the embodiments presented herein. System **100** can be employed in many different embodiments or examples not specifically depicted or described herein.

System **100** comprises keyboard-video-mouse (KVM) switching device **101**. KVM switching device **101** is configured to route host computer audio-visual data (e.g., audio data and/or video data) from one or more host computer systems **102** to control terminal **113**. For example, KVM switching device **101** can be configured to route the host computer audio-visual data from one or more presently selected host computer systems (e.g., host computer system **103**) of host computer system(s) **102** to control terminal **113**. Generally speaking, the presently selected host computer system(s) only comprises one host computer system of host computer system(s) **102** although the presently selected host computer system(s) could comprise multiple ones of host computer system(s) **102** in some embodiments. Accordingly, one or more users of system **100** and/or KVM switching device **101** can select from which of host computer system(s) **102** (e.g., host computer system **103**) to receive the host computer audio-visual data at control terminal **113** by using user interface **111**, as described in further detail below. As a result, KVM switching device **101** is configured to provide control (e.g., centralized control) of host computer system(s) **102** (e.g., to the user(s) of system **100** and/or KVM switching device **101**) via user interface **111**. FIG. **15** illustrates an exemplary system **100** being used by the user(s).

Control terminal **113** can comprise audio-visual display device **114** (e.g., an electronic visual display such as a computer monitor and/or the like), one or more peripheral input devices **117** (e.g., computer keyboard **115**, computer mouse **116**, and/or the like), and/or at least one speaker (not shown). Audio-visual device **114** can be similar or identical to refreshing monitor **1706** (FIGS. **17** & **18**). Computer keyboard **115** can be similar or identical to keyboard **1704** (FIGS. **17** & **18**). Computer mouse **116** can be similar or identical to mouse **1710** (FIGS. **17** & **18**). The speaker(s) can be integrated with and/or separate from audio-visual display device **114**. Audio-visual display device **114** and/or the speaker(s) can be configured to present the host computer audio-visual data to the user(s) of control terminal **113**. Peripheral input device(s) **117** can be configured to permit the user(s) to provide command data (e.g., one or more user input(s)) to host computer system(s) **102** and/or KVM switching device **101** in order to communicate with and/or to operate host computer system(s) **102** and/or KVM switching device **101**. Accordingly, when the user(s) are operating peripheral input device(s) **117** of control terminal **113**, KVM switching device **100** can also be configured to route the command data from peripheral input device(s) **117** of control terminal **113** to host computer system(s) **102**. In some embodiments, system **100** can comprise one or more of control terminal **113**, one or more of audio-visual display device **114**, and one or more of peripheral input device(s) **117** such as keyboard **115**, mouse **116**, and/or the speaker(s). The interactions of control terminal **113**, audio-visual display device **114**, peripheral input device(s) **117**, keyboard **115**, mouse **116**, and/or the speaker(s), with respect to routing the audio-visual data and/or the command data, are described in further detail below with respect to FIG. **2**.

In many embodiments, host computer system(s) **102** can comprise four computer system (e.g., host computer system **103**, host computer system **104**, host computer system **105**, and/or host computer system **106**). In other embodiments, host computer system(s) **102** can comprise more or less than four computer systems. Each host computer system of host computer system(s) **102** (e.g., host computer system **103**, host computer system **104**, host computer system **105**, and/or host computer system **106**) can be similar or identical to computer system **1700** (FIG. **17**), as described below. In another embodiment, each host computer system of host computer system(s) **102** (e.g., host computer system **103**, host computer system **104**, host computer system **105**, and/or host computer system **106**) can be similar or identical to chassis **1702** (FIG. **17**) of computer system **1700** (FIG. **17**) and the circuit board(s) and/or other component(s) contained in chassis **1702** (FIG. **17**), as described below. In some embodiments, system **100** can comprise two or more of host computer system(s) **102** (e.g., host computer system **103**, host computer system **104**, host computer system **105**, and/or host computer system **106**). In various embodiments, any host computer system of host computer system(s) **102** can be configured to require a common access card (CAC) (e.g., authentication and/or validation of the CAC) in order to be secured and/or operated, as described in further detail below.

System **100** and/or KVM switching device **101** can comprise one or more switching device peripheral device(s) **120** configured to communicate with KVM switching device **101**. In many embodiments, switching device peripheral device(s) **120** can comprise CAC reader **121**. CAC reader **121** can be configured to receive the CAC and permit the user(s) to access one or more of host computer system(s) **102** when any of those host computer systems require CAC access. In the same or different embodiments, switching device peripheral device(s) **120** can comprise any suitable other slave device **122** (e.g., a printer, an external hard drive, a modem, one or more speakers, etc.). In some embodiments, any of switching device peripheral device(s) **120** can be part of and/or can be located at control terminal **113** (e.g., for ease of access to the user(s) of system **100**). In other embodiments, one or more of switching device peripheral device(s) **120** can be located remotely from terminal **113**. KVM switching device **101** can permit communication between the switching device peripheral device(s) **120** and the appropriate host computer system(s) **102**. In many embodiments, switching device peripheral device(s) **120** can be coupled to KVM switching device **101** via different connectors (although the connectors may be the same type of connectors) than peripheral input device(s) **117**.

Further, system **100** can comprise user interface **111**. As mentioned briefly above, user interface **111** can be configured to control KVM switching device **101**, thereby facilitating control (e.g., central control) of host computer system(s) **102**. Accordingly, KVM switching device **101** can be configured to communicate with user interface **111**. In many embodiments, user interface **111** can be coupled (e.g., mechanically and/or electrically) with KVM switching device **101**. Coupling user interface **111** to KVM switching device **101** can facilitate communication between user interface **111** and KVM switching device **101** and also can facilitate communication between KVM switching device **101** and host computer system(s) **102**.

User interface **111** can be integrated with or separate from KVM switching device **101**. Further, user interface **111** can be configured to communicate with KVM switching device **101** through wired and/or wireless communication. For example, user interface **111** can be configured to communicate with KMC switching device **101** via (a) one or more

components configured to provide wired communication (e.g., one or more data buses, such as, for example, universal serial bus(es); one or more networking cables, such as, for example, coaxial cable(s), optical fiber cable(s), twisted pair cable(s); any other suitable data cable, etc.) and/or (b) one or more components configured to provide wireless communication (e.g., one or more radio transceivers, one or more infrared transceivers, etc.). Further, the wired and/or wireless communication can be implemented using any one or any combination of wired and/or wireless communication network topologies (e.g., ring, line, tree, bus, mesh, star, daisy chain, hybrid, etc.) and/or protocols (e.g., personal area network (PAN) protocol(s), local area network (LAN) protocol(s), wide area network (WAN) protocol(s), cellular network protocol(s), Powerline network protocol(s), etc.). Exemplary PAN protocol(s) can comprise Bluetooth, Zigbee, Wireless Universal Serial Bus (USB), Z-Wave, etc.; exemplary LAN and/or WAN protocol(s) can comprise Institute of Electrical and Electronic Engineers (IEEE) 802.3, IEEE 802.11, etc.; and exemplary wireless cellular network protocol(s) can comprise Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), Code Division Multiple Access (CDMA), Evolution-Data Optimized (EV-DO), Enhanced Data Rates for GSM Evolution (EDGE), 3GSM, Digital Enhanced Cordless Telecommunications (DECT), Digital AMPS (IS-136/Time Division Multiple Access (TDMA)), Integrated Digital Enhanced Network (iDEN), etc. The components implementing the wired and/or wireless communication can be dependent on the network topologies and/or protocols in use, and vice versa.

Accordingly, in many embodiments, when user interface **111** is separate from KVM switching device **101**, user interface **111** can operate as a remote user interface. For example, user interface **111** could communicate with KVM switching device **101** using a mesh wireless communication network such as a Bluetooth™ mesh computer network connection. However, in many examples, using wired communication between user interface **111** and KVM switching device **101** can provide increased security of the host computer audio-visual data where heightened security is an issue. When user interface **111** is configured to communicate with KVM switching device **101** through a wired coupling, user interface **111** can comprise the cable and/or bus connector (e.g., the cable and/or bus connector can be integral with user interface **111**). The cable and/or bus connector can be approximately 3.05 meters (10 feet) in length. In some embodiments, the cable and/or bus connector can be coupled to KVM switching device **101** via a latching connector. In many embodiments, user interface **111** is not an onscreen display (OSD) (i.e., user interface **111** is not provided (e.g., displayed) via control terminal **113** and/or audio-visual display device **114**), but rather is a separate electronic device.

Operating user interface **111** remotely from KVM switching device **101** can provide various advantages to the user(s) employing system **100**. For example, the user(s) of system **100** can operate user interface **111** at a location proximate to control terminal **113** (e.g., on a desktop surface supporting control terminal **113**) while the remaining elements of system **100** (e.g., KVM switching device **101**, host computer system(s) **102**, etc.) can be located elsewhere (e.g., under the desk having the desktop surface and/or in another room, building, etc.), thereby reducing the spatial volume of system **100** located proximate to control terminal **113** (e.g., saving space on the desktop surface) and/or the user(s). In the same example, user interface **111** could be located near peripheral input device(s) **117** (e.g., mouse **116**) of control terminal **113**. Meanwhile, operating user interface **111** also can provide ease of switching between host computer system(s) **102** by bringing user interface **111** to the user(s) as opposed to requiring the user(s) to go to KVM switching device **101**, which may be inconveniently located away from control terminal **113** and/or the user(s) (e.g., under the desktop surface supporting control terminal **113** mentioned above), thereby minimizing switching errors (e.g., by switching to an incorrect host computer system) and/or providing clear, unambiguous indication of which host computer system is presently selected, as explained in greater detail below.

Operating user interface **111** remotely from KVM switching device **101** can also provide various advantages to technicians tasked with installing and maintaining system **100**. For example, operating user interface **111** remotely from KVM switching device **101** can permit quicker deployment and/or easier replacement of system **100**, KVM switching device **101**, and/or user interface **111**. Likewise, operating user interface **111** remotely from KVM switching device **101** can further improve reliability and durability of system **100**, KVM switching device **101**, and/or user interface **111**, reducing the need for technical support of system **100**, KVM switching device **101**, and/or user interface **111**.

User interface **111** can comprise one or more user interface inputs (e.g., capacitive buttons, resistive buttons, and/or mechanical buttons) permitting the user(s) of system **100** to select from which host computer system(s) of host computer system(s) **102** to route the host computer audio-visual data to control terminal **113**, where each user interface input is associated with one physical port of KVM switching device **101**, as described in further detail below. Meanwhile, user interface **111** can be configured (e.g., by the user(s), as described below) to associate a number, name, symbol, and/or a color with each respective host computer system of host computer system(s) **102** by assigning that number, name, symbol, and/or color that is associated with the respective host computer system of host computer system(s) **102** to the user interface input associated with that physical port to which the respective host computer system is coupled. The user(s) of system **100** can customize the association of a number, name, symbol, and/or color established by user interface **111** during configuration of user interface **111**, as described below. In some embodiments, the number associated with each user interface input is static and not subject to customization but the name, symbol, and/or color remain subject to customization. In various embodiments, the user interface input(s) can be recessed into the front surface of user interface **111** to prevent accidental activation by the user(s) of system **100**.

In some embodiments, user interface **111** can comprise an electronic display (e.g., a liquid crystal display such as a monochrome liquid crystal display, an organic light emitting diode display, etc.). The electronic display can comprise a touch screen electronic display (e.g., a capacitive or a resistive touch screen electronic display). The electronic display can comprise the user interface input(s), and/or the user interface input(s) can be separate from the electronic display, as shown in FIG. **1**. In the same or different embodiments, the user interface input(s) can comprise one or more light emitting diodes (e.g., red-green-blue (RGB) light emitting diodes) configured to emit one or more colors (e.g., whichever color is selected for association with that particular user interface input and/or that host computer system coupled to the physical port with which that particular user interface input is associated). In other embodiments, when the user interface input(s) are implemented as mechanical buttons as opposed to capacitive and/or resistive buttons operating as part of an electronic display of user interface **111**, the user interface input(s) can comprise the light emitting diodes (i.e., because

the color coding could otherwise be implemented at the electronic display as opposed to the separate light emitting diodes).

For example, user interface **111** can comprise an organic light emitting diode (OLED) capacitive electronic display (e.g., an OLED touch screen display). In some embodiments, the user interface input(s) can comprise capacitive buttons displayed on the OLED capacitive display. Each user interface input can display the name, symbol, and/or color associated with the respective host computer system coupled to the physical port with which that user interface input is associated.

In another example, user interface **111** can comprise a monochrome liquid crystal display and the user interface input(s) can comprise one or more mechanical buttons positioned adjacent to the liquid crystal display. Accordingly, each user interface input can comprise one or more light emitting diodes configured to emit one or more colors, as determined upon configuration of user interface **111** by the user(s). A number can be pre-assigned to each user interface input, and the liquid crystal display can be configured to display a name associated with each of the user interface input(s) (e.g., at least for those user interface input(s) that are coupled to a host computer system of host computer system(s) **102**) next to that respective user interface input of the user interface input(s).

Turning ahead in the drawings, FIG. **23** illustrates an exploded view of an exemplary user input **2300** implemented as a mechanical button, according to an embodiment. User input **2300** can be similar or identical to one of the user input(s) described above with respect to system **100** (FIG. **1**). Accordingly, multiple of user input **2300**, as described below, can be implemented to provide the user input(s) of system **100** (FIG. **1**).

User input **2300** can comprise face portion **2301** and connector portion **2302**. Face portion **2301** can comprise opening **2304** and can be configured to couple with connector portion **2302**. When face portion **2301** is coupled with connector portion **2302**, user input **2300** can comprise recess **2305**. In some embodiments, face portion **2301** can also comprise opening **2306**. Further, user input **2300** can comprise color chip **2303**. Meanwhile, connector portion **2302** can comprise coupling mechanism **2307**.

Connector portion **2302** can be coupled to a user interface via coupling mechanism **2307**. For example, the user interface can be similar or identical to user interface **111**. Accordingly, user input **2300** can be coupled to the user interface via connector portion **2302**. An electronic display of the user interface can be positioned proximate to user input **2300** so as to display a relevant number, name, symbol, and/or color associated with user input **2300** next to user input **2300**. The electronic display can be similar or identical to the electronic display of user interface **111**.

Color chip **2303** can be coupled with user input **2300**, thereby permitting association of a color of color chip **2303** with user input **2300**, such as, for example, to permit distinction of user input **2300** from another user input. Further, color chip **2303** can be interchangeable with one or more other color chips similar or identical to color chip **2303** so that user input **2300** can be customized by the user(s) of user input **2300**. For example, color chip **2303** and the other color chips each can comprise different colors configured to permit differentiation of each of color chip **2303** and the other color chips from each other. User input **2300** and/or recess **2305** can be configured to receive color chip **2303**, and recess **2305** can be shaped to match a shape of color chip **2303**. For example, color chip **2303** and recess **2305** can be approximately semi-circular in shape although other suitable shapes can also be used. Accordingly, recess **2305** can be configured to receive color chip **2303** via opening **2304**. That is, color chip **2303** can be inserted into recess **2303** through opening **2304** and where applicable, around to opening **2306** on an opposite side of recess **2305** from opening **2304**. Color chip **2303** can be removable from user input **2300** and/or recess **2305**, such as, for example, when face portion **2301** comprises opening **2306**. For example, by application of force (e.g., via a pin or a similarly pointed object, such as, for example, an unfolded paper clip) to color chip **2303** through opening **2306**, color chip **2303** can be partially pressed out of recess **2305** via opening **2304** and extracted from recess **2305** via opening **2304**. Accordingly, color chip **2303** can be replaced with another color chip, as desired. In some embodiments, one or more of the color chips (e.g., color chip **2303**) can comprise the same color, as desirable. Color chip **2303** can comprise a marker (e.g., an arrow) to indicate how to insert color chip **2303** into opening **2304** and/or recess **2305**.

FIGS. **24-28** illustrate user input **2300** from various different views when user input has received color chip **2303**, according to the embodiment of FIG. **23**. For example, FIG. **24** shows a front, right, top isometric view of user input **2300**. FIG. **25**, shows a rear, right, top isometric view of user input **2300**. FIG. **26**, shows a front, bottom isometric view of user input **2300**. FIG. **27** shows a front, top isometric view of user input **2300**. Finally, FIG. **28**, shows a front view of user input **2300**.

Returning now to FIG. **1**, by implementing the user interface input(s) as part of an electronic display of user interface **111**, user interface **111** can be smaller and therefore occupy less space. This approach can also remove redundancy where a number, name, symbol, and/or color of the port might otherwise be displayed both on the electronic display and separate user interface input(s). Likewise, this approach can offer a singular point of feedback as well as higher visibility than alternative approaches for implementing the user interface input(s) as a result of higher contrast and/or resolution provided by the electronic display.

In an operational example of user interface **111**, illumination and/or color of the number associated with each of the user interface input(s) can indicate whether or not there is a host computer system of host computer system(s) **102** coupled to the physical port with which that user interface input is associated (i.e., whether or not the user interface input and/or the related physical port are presently active) and/or whether or not the host computer coupled to the physical port with which each of the respective user interface input(s) is associated is presently selected for use by the user(s). For example, the number of any user interface input that is presently active, but not presently selected, can be illuminated and/or colored to appear light grey whereas the number of inactive user inputs can appear dark grey. Meanwhile, the number of any presently selected and active user interface input (i.e., host computer system) can be illuminated and/or colored white. Further, the user interface input(s) can indicate whether or not CAC access is required to login to the host computer system related to that particular user interface input, such as, for example, by displaying a symbol (e.g., an icon of a card) at each of the user interface input(s) indicative of whether or not CAC access is required to login to the host computer system related to that particular user interface input.

User interface **111** can comprise a housing (e.g., a plastic housing). For increased security, the housing can be sealed with tamper-evident labels to indicate if the housing has been

compromised. FIG. **14** illustrates an exemplary user interface **111** (FIG. **1**) and/or exemplary user interface input(s) of user interface **111** (FIG. **1**).

Meanwhile, user interface **111** can also be configured to be paired with (e.g., authenticated by) KVM switching device **101**. In various embodiments, only one user interface **111** can be paired with KVM switching device **101** at any given time. In many embodiments, user interface **111** can be configured not to communicate with KVM switching device **101**, or vice versa, until user interface **111** is paired with KVM switching device **101**. In the same or different embodiments, KVM switching device **101** can be configured such that user interface **111** cannot communicate with and/or control KVM switching device **101** until the user interface **111** has been configured by the user(s). FIG. **2** is a block diagram illustrating system **100**, according to the embodiment of FIG. **1**. FIG. **2** helps to illustrate system **100**, KVM switching device **101**, and/or user interface **111** in operation generally and also helps to illustrate pairing user interface **111** with KVM switching device **101** as well as configuring user interface **111** to permit user interface **111** to control KVM switching device **101**.

Referring now to FIG. **2**, KVM switching device **101** (FIG. **1**) comprises KVM circuitry **201**. KVM circuitry **201** can be configured to permit KVM switching device **101** (FIG. **1**) to route the host computer audio-visual data from host computer system(s) **102** (FIG. **1**) to control terminal **113** (FIG. **1**). KVM circuitry **201** can comprise one or more physical port(s) **207** (e.g., physical port **202**, physical port **203**, physical port **204**, and/or physical port **205**). Each physical port of physical port(s) **207** can be configured to couple with one host computer system of host computer system(s) **102** (FIG. **1**). Each physical port of physical port(s) **207** can comprise at least one audio-visual input connector and at least one peripheral input device connector. For example, the audio-visual input connector(s) can comprise any suitable audio-visual device connector(s) (e.g., a universal serial bus (USB) connector, a high-definition multimedia interface (HDMI) connector, a digital visual interface (DVI) connector, a display port (DP) connector, a video graphics array (VGA) connector, composite cable connectors, an S-Video connector, an optical audio connector, Radio Corporation of America (RCA) connectors, a tip-ring-sleeve (TRS) connector such as a 3.5 millimeter TRS connector, etc.) and can be configured to receive a corresponding data cable and/or bus configured to couple to any appropriate corresponding audio-visual input connector(s) of the corresponding host computer system of host computer system(s) **102** (FIG. **1**). Further, the peripheral input device connector(s) can comprise any suitable peripheral input device connectors (e.g., a USB connector, a keyboard/mouse connector, etc.) and can be configured to receive a corresponding data cable and/or bus configured to couple to any appropriate corresponding peripheral input device connector(s) of the corresponding host computer system of host computer system(s) **102** (FIG. **1**). Meanwhile, KVM circuitry **201** can also comprise separate audio-visual input connector(s) and peripheral input device connector(s) configured to couple control terminal **113** (FIG. **1**) (e.g., audio-visual display device **114** (FIG. **1**), the speaker(s) of control terminal **113** (FIG. **1**), peripheral input device(s) **117** (FIG. **1**), computer keyboard **115** (FIG. **1**), computer mouse **116** (FIG. **1**), etc.) to KVM switching device **101** (FIG. **1**). Accordingly, KVM circuitry **201** can comprise any suitable electrical networks configured to route host computer audio-visual data from any appropriate host computer system(s) (e.g., the presently selected host computer system(s)) of host computer system(s) **102** (FIG. **1**)) through the corresponding physical port of physical port(s) **107** (FIG. **1**) to control terminal **113** (FIG. **1**) via the corresponding data cable(s) and/or bus(es) and data cable and/or bus connector(s), as appropriate. Likewise, KVM circuitry **102** (FIG. **1**) can comprise any suitable electrical networks configured to route command data from control terminal **113** (FIG. **1**) to the appropriate host computer system(s) (e.g., the presently selected host computer system(s)) of host computer system(s) **102** (FIG. **1**)) and/or virtual port **206**, as described below, via the corresponding data cable(s) and/or bus(es) and data cable and/or bus connector(s), as appropriate. Further, KVM circuitry **201** and/or its electrical networks can comprise any suitable electrical switches for implementing the KVM functionality of KVM switching device **101** (FIG. **1**), as is well known to those having ordinary skill in the art such that it will not receive a detailed description herein. Further still, KVM circuitry **201** can comprise any suitable electrical networks configured to permit host computer(s) **102** (FIG. **1**) and/or control terminal **113** (FIG. **1**) to communicate with switching device peripheral device(s) **120** (FIG. **1**), as applicable. Although communication between host computer system(s) **102** (FIG. **1**), switching device peripheral device(s) **120** (FIG. **1**), control terminal **113** (FIG. **1**), and KVM switching device **101** (FIG. **1**), is generally described here with respect to wired communication, wireless communication similar to that described above with respect to the communication between KVM switching device **101** (FIG. **1**) and user interface **111** (FIG. **1**) could alternatively and/or additionally be implemented here.

KVM switching device **101** (FIG. **1**) also can comprise virtual port **206**. In some embodiments, virtual port **206**, KVM system **100** (FIG. **1**), and/or KVM switching device **101** (FIG. **1**) can comprise a virtual port computer system. In the same or different embodiments, virtual port **206** can be configured to communicate with the virtual port computer system. The virtual port computer system can be similar or identical to computer system **1700** (FIG. **17**), as described below. In another embodiment, the virtual port computer system can be similar or identical to chassis **1702** (FIG. **17**) of computer system **1700** (FIG. **17**) and the circuit board(s) and/or other component(s) contained in chassis **1702** (FIG. **17**), as described below. In many respects, virtual port **206** can be similar to any physical port of physical port(s) **107** but for that virtual port **206** and/or the virtual port computer system can be part of (e.g., internal to and/or integral with) KVM switching device **101** (FIG. **1**).

In many embodiments, one or more of the audio-visual input connector(s) and/or peripheral input device connector(s) of virtual port **206** and/or one or more of physical port(s) **207** can be implemented as electrical networks of KVM circuitry **201** (i.e., the audio-visual input connector(s) and/or peripheral input device connector(s) would not be externally accessible to the user(s)). Still, in many embodiments, virtual port **206** comprises another physical port similar or identical to physical port(s) **107** (FIG. **1**) and can be physically located at the exterior of KVM switching device **101** (FIG. **1**) (i.e., making virtual port **206** externally accessible to the user(s)). Regardless of the manner of implementation, virtual port **206** and/or the virtual port computer system (a) can be configured to route switching device audio-visual data from virtual port **206** and/or the visual port computer system to control terminal **113** and/or (b) can be configured to receive command data from control terminal **113** (FIG. **1**) (e.g., from peripheral input device(s) **117** (FIG. **1**)) through any of the various data cable(s) and/or bus(es) and data cable and/or bus connector(s) coupling KVM switching device **101** (FIG. **1**) and control terminal **113** (FIG. **1**), as appropriate. Still, in many embodiments, the virtual port computer system may not have the level of sophistication

and/or complexity of host computer system(s) **102** (FIG. **1**). For example, the virtual port computer system may only have those processing capabilities and/or memory storage capabilities as are reasonably necessary to pair user interface **111** (FIG. **1**) with KVM switching device **101** (FIG. **1**) and/or to configure KVM switching device **101** (FIG. **1**), as is described in further detail below. In these examples, the virtual port computer system could simply be implemented as a microcontroller comprising flash memory, or the like. Reducing the sophistication and/or complexity of the virtual computer system can reduce the size and/or cost of implementing system **100** (FIG. **1**). Nonetheless, in other embodiments, the virtual port computer system may need additional sophistication and/or complexity to operate as desired.

Virtual port **206**, KVM switching device **101** (FIG. **1**), and/or the virtual computer system can comprise one or more memory storage modules (e.g., the storage modules of computer system **1700** (FIG. **17**) and/or flash memory, as described above). The memory storage module(s) can be configured to store a code indicating the pairing of user interface **111** (FIG. **1**) with KVM switching device **101** (FIG. **1**), an indicator (e.g. a flag) of whether user interface **111** (FIG. **1**) is presently configured, and/or configuration settings (e.g., numbers, names, symbols, and/or colors associated with the user interface input(s), the physical port(s) of the user interface, and/or the host computer system(s) as described above with respect to system **100** (FIG. **1**)).

Skipping ahead now in the drawings, FIG. **17** illustrates an exemplary embodiment of computer system **1700** and chassis **1702** (and its internal components) that can be suitable for implementing an embodiment of host computer system(s) **102** (FIGS. **1** & **2**), the virtual port computer system, and/or a user interface computer system and/or another part of system **100** (FIGS. **1** & **2**) as well as methods **1600** (FIG. **16**) and **3100** (FIG. **31**) and/or any of the various procedures, processes, and/or activities of methods **1600** (FIG. **16**) and/or **3100** (FIG. **31**). One or more parts of computer system **1700** (e.g., refreshing monitor **1706**, keyboard **1704**, and/or mouse **1710**, etc.) may also be appropriate for implementing control terminal **113** (FIG. **1**). Computer system **1700** includes chassis **1702** containing one or more circuit boards (not shown), Universal Serial Bus (USB) **1712**, Compact Disc Read-Only Memory (CD-ROM) and/or Digital Video Disc (DVD) drive **1716**, and hard drive **1714**. A representative block diagram of the elements included on the circuit boards inside chassis **1702** is shown in FIG. **17**. Central processing unit (CPU) **1810** in FIG. **18** is coupled to system bus **1814** in FIG. **18**. In various embodiments, the architecture of CPU **1810** can be compliant with any of a variety of commercially distributed architecture families.

System bus **1814** also is coupled to memory **1808**, where memory **1808** includes both read only memory (ROM) and random access memory (RAM). Non-volatile portions of memory **1808** or the ROM can be encoded with a boot code sequence suitable for restoring computer system **1700** (FIG. **17**) to a functional state after a system reset. In addition, memory **1808** can include microcode such as a Basic Input-Output System (BIOS). In some examples, the one or more storage modules of the various embodiments disclosed herein can include memory **1808**, USB **1712** (FIGS. **17-18**), hard drive **1714** (FIGS. **17-18**), and/or CD-ROM or DVD drive **1716** (FIGS. **17-18**). In the same or different examples, the one or more storage modules of the various embodiments disclosed herein can comprise an operating system, which can be a software program that manages the hardware and software resources of a computer and/or a computer network. The operating system can perform basic tasks such as, for example, controlling and allocating memory, prioritizing the processing of instructions, controlling input and output devices, facilitating networking, and managing files. Examples of common operating systems can include Microsoft® Windows, Mac® operating system (OS), UNIX® OS, and Linux® OS. Common operating systems for a mobile electronic device include the iPhone® operating system by Apple Inc. of Cupertino, Calif., the Blackberry® operating system by Research In Motion (RIM) of Waterloo, Ontario, Canada, the Palm® operating system by Palm, Inc. of Sunnyvale, Calif., the Android operating system developed by the Open Handset Alliance, the Windows Mobile operating system by Microsoft Corp. of Redmond, Wash., or the Symbian operating system by Nokia Corp. of Espoo, Finland.

As used herein, "processor" and/or "processing module" means any type of computational circuit, such as but not limited to a microprocessor, a microcontroller, a controller, a complex instruction set computing (CISC) microprocessor, a reduced instruction set computing (RISC) microprocessor, a very long instruction word (VLIW) microprocessor, a graphics processor, a digital signal processor, or any other type of processor or processing circuit capable of performing the desired functions.

In the depicted embodiment of FIG. **18**, various I/O devices such as disk controller **1804**, graphics adapter **1824**, video controller **1802**, keyboard adapter **1826**, mouse adapter **1806**, network adapter **1820**, and other I/O devices **1822** can be coupled to system bus **1814**. Keyboard adapter **1826** and mouse adapter **1806** are coupled to keyboard **1704** (FIGS. **17-18**) and mouse **1710** (FIGS. **17-18**), respectively, of computer system **1700** (FIG. **17**). While graphics adapter **1824** and video controller **1802** are indicated as distinct units in FIG. **18**, video controller **1802** can be integrated into graphics adapter **1824**, or vice versa in other embodiments. Video controller **1802** is suitable for refreshing monitor **1706** (FIGS. **17-18**) to display images on a screen **1708** (FIG. **17**) of computer system **1700** (FIG. **17**). Disk controller **1804** can control hard drive **1714** (FIGS. **17-18**), USB **1712** (FIGS. **17-18**), and CD-ROM drive **1716** (FIGS. **17-18**). In other embodiments, distinct units can be used to control each of these devices separately.

In some embodiments, network adapter **1820** can be part of a WNIC (wireless network interface controller) card (not shown) plugged or coupled to an expansion port (not shown) in computer system **1700**. In other embodiments, the WNIC card can be a wireless network card built into computer system **1700**. A wireless network adapter can be built into computer system **1700** by having wireless Ethernet capabilities integrated into the motherboard chipset (not shown), or implemented via a dedicated wireless Ethernet chip (not shown), connected through the PCI (peripheral component interconnector) or a PCI express bus. In other embodiments, network adapter **1820** can be a wired network adapter.

Although many other components of computer system **1700** (FIG. **17**) are not shown, such components and their interconnection are well known to those of ordinary skill in the art. Accordingly, further details concerning the construction and composition of computer system **1700** and the circuit boards inside chassis **1702** (FIG. **17**) are not discussed herein.

When computer system **1700** in FIG. **17** is running, program instructions stored on a USB-equipped electronic device connected to USB **1712**, on a CD-ROM or DVD in CD-ROM and/or DVD drive **1716**, on hard drive **1714**, or in memory **1808** (FIG. **18**) are executed by CPU **1810** (FIG. **18**). A portion of the program instructions, stored on these

devices, can be suitable for carrying out at least part of system **100** (FIGS. **1** & **2**), method **1600** (FIG. **16**), and/or method **3100** (FIG. **31**).

Although computer system **1700** is illustrated as a desktop computer in FIG. **17**, there can be examples where computer system **1700** may take a different form factor (e.g., a mobile electronic device, a laptop computer) while still having functional elements similar to those described for computer system **1700**. In some embodiments, computer system **1700** may comprise a single computer, a single server, or a cluster or collection of computers or servers, or a cloud of computers or servers. Typically, a cluster or collection of servers can be used when the demand on computer system **1700** exceeds the reasonable capability of a single server or computer.

Returning again to FIG. **2**, virtual port **206** and/or the virtual port computer system can be configured to permit the user(s) to pair user interface **111** (FIG. **1**) with KVM switching device **101** (FIG. **1**) and to configure the manner in which user interface **111** (FIG. **1**) controls KVM switching device **101** (FIG. **1**) and the respective host computer system(s) **102** (FIG. **1**), as a result.

To begin with, upon turning on KVM switching device **101** (FIG. **1**), KVM switching device **101** (FIG. **1**) can be configured to detect whether user interface **111** (FIG. **1**) is presently coupled with KVM switching device **101** (FIG. **1**). If KVM switching device **101** (FIG. **1**) detects user interface **111** (FIG. **1**) is not presently coupled with it, KVM switching device **101** (FIG. **1**) can be configured to switch to virtual port **206** and virtual port **206** can be configured to route switching device audio-visual data from virtual port **206** (e.g., from the virtual port computer system) to control terminal **113** (FIG. **1**). The switching device audio-visual data can instruct the user(s) to couple user interface **111** (FIG. **1**) to KVM switching device **101** (FIG. **1**) and can be presented by control terminal **113** (FIG. **1**) (e.g., via audio-visual display device **114** and/or the speaker(s) of control terminal **113**). FIG. **3** illustrates exemplary switching device audio-visual data instructing the user(s) to couple user interface **111** (FIG. **1**) to KVM switching device **101** (FIG. **1**). As an example, this switching device audio-visual data can be presented to the user(s) on audio-visual display device **114**. When KVM switching device **101** (FIG. **1**) detects user interface **111** (FIG. **1**), KVM switching device **101** (FIG. **1**) can proceed to pairing with user interface **111** (FIG. **1**).

After coupling with user interface **111** (FIG. **1**), KVM switching device **101** (FIG. **1**) can be configured to detect whether user interface **111** (FIG. **1**) is presently paired with KVM switching device **101** (FIG. **1**). If KVM switching device **101** (FIG. **1**) detects user interface **111** (FIG. **1**) is not presently paired with it, KVM switching device **101** (FIG. **1**) can be configured to switch to virtual port **206**, and virtual port **206** can be configured to route switching device audio-visual data from virtual port **206** (e.g., from the virtual port computer system) to control terminal **113** (FIG. **1**). The switching device audio-visual data can instruct the user(s) to enter a code presented at user interface **111** (FIG. **1**) to pair KVM switching device **101** (FIG. **1**) and user interface **111** (FIG. **1**). This switching device audio-visual data can be presented by control terminal **113** (FIG. **1**). FIG. **4** illustrates exemplary switching device audio-visual data presented or displayed at audio-visual device **114** and instructing the user(s) to provide the code presented at user interface **111** (FIG. **1**). Meanwhile, user interface **111** (FIG. **1**) can present user interface audio-visual data at user interface **111** (FIG. **1**) where the user interface audio-visual data can comprise the code for pairing user interface **111** (FIG. **1**) with KVM switching device **101** (FIG. **1**). FIG. **5** illustrates exemplary user interface audio-visual data comprising the code presented at user interface **111** (FIG. **1**).

The user(s) can provide the code (e.g., as command data) to control terminal **113** (FIG. **1**) via peripheral input device(s) **117** (FIG. **1**) and/or the user interface input(s) of user interface **111** (FIG. **1**). For example, the user(s) can enter the code via computer keyboard **115** (FIG. **1**) and/or mouse **116** (FIG. **1**), as would be the case where the code resembles the code in FIG. **5**, or can enter the code as some particular provided sequence of the user interface input(s) of user interface **111** (FIG. **1**). FIG. **6** illustrates the user(s) providing the code to control terminal **113** (FIG. **1**) via the user interface input(s).

When the user(s) incorrectly provide the code presented at user interface **111** (FIG. **1**) to KVM switching device **101** (FIG. **1**) via control terminal **113** (FIG. **1**), virtual port **206** can provide updated switching device audio-visual data at control terminal **113** (FIG. **1**) notifying the user(s) that the code has been incorrectly entered and needs to be entered again. If the user(s) provide a wrong code multiple times (e.g., ten times), virtual port **206** can again provide updated switching device audio-visual data notifying the user(s) to contact an administrator and/or a manufacturer of KVM switching device **101** (FIG. **1**). FIG. **7** illustrates exemplary switching device audio-visual data notifying the user(s) that the code has been incorrectly entered and needs to be entered again. FIG. **13** illustrates exemplary user interface audio-visual data notifying the user(s) to contact the administrator and/or the manufacturer.

When the user(s) correctly provide the code, KVM switching device **101** (FIG. **1**) can erase its memory storage module(s) of any previously paired user interface (e.g., previous configuration settings, codes, flags, etc.). The KVM switching device **101** (FIG. **1**) can then be paired with user interface **111** (FIG. **1**).

After pairing with user interface **111** (FIG. **1**), KVM switching device **101** (FIG. **1**) can be configured to detect whether user interface **111** (FIG. **1**) is presently configured. If KVM switching device **101** (FIG. **1**) detects user interface **111** (FIG. **1**) is presently configured, KVM switching device **101** (FIG. **1**) can be configured to switch to a predetermined physical port of physical port(s) **102** (e.g., physical port **202** (FIG. **2**)). If, instead, KVM switching device **101** (FIG. **1**) detects user interface **111** (FIG. **1**) is not presently configured, KVM switching device **101** (FIG. **1**) can disable the user interface input(s) of user interface **111** (FIG. **1**) until completion of the configuration of user interface **111** (FIG. **1**), and virtual port **206** can present switching device audio-visual device at control terminal **113** (FIG. **1**). Meanwhile, user interface **111** (FIG. **1**) can present user interface audio-visual data notifying the user(s) that user interface **111** (FIG. **1**) is nearly ready for use and/or to configure user interface **111** (FIG. **1**) at control terminal **113** (FIG. **1**) (e.g., via peripheral input device(s) **117**). FIG. **8** illustrates exemplary user interface audio-visual data notifying the user(s) that user interface **111** (FIG. **1**) is nearly ready for use and to configure user interface **111** (FIG. **1**) at control terminal **113** (FIG. **1**).

For purposes of configuring user interface **111** (FIG. **1**), the switching device audio-visual data present at audio-visual display device **114** can comprise a configuration module configured to permit the user(s) to configure the manner in which the user(s) desire user interface **111** (FIG. **1**) to control KVM switching device **101** (FIG. **1**) and/or host computer system(s) **102** (FIG. **1**). FIG. **9** illustrates an exemplary configuration module displayed at audio-visual display device **114** (FIG. **1**). The configuration module can comprise one or more graphical user interface (GUI) inputs by which the user(s) can configure user interface **111** (FIG. **1**). The con-

figuration module can permit the user(s) to select which physical port(s) **207** (FIG. **2**) are presently, or desired to be, active (e.g., via a check box input). The configuration module can also comprise one or more check boxes indicating whether any of the host computer system(s) **102** (FIG. **1**) coupled to physical port(s) **207** (FIG. **2**) require CAC access. Likewise, the configuration module can also comprise one or more drop down lists for selecting names and/or colors for each of physical port(s) **207** and/or host computer system(s) **102** (FIG. **1**). Finally, the configuration module can also have a GUI input (e.g., a "Done" button) by which the user(s) can affirm that he/she/they are done configuring user interface **111** (FIG. **1**).

In some embodiments, the user(s) can deactivate one or more physical ports of physical port(s) **207** (FIG. **2**). FIG. **10** illustrates an exemplary configuration module displayed at audio-visual display device **114** where a physical port (e.g., physical port **204**) has been disabled. In many embodiments, the user(s) can customize the name of any physical port of physical port(s) **207**. The user(s) can selected the customized name of the physical port by selecting an appropriate entry from the name drop down list of that physical port at the configuration module. FIG. **11** illustrates an exemplary drop down list where the user(s) can select to customize the name of a physical port. Selecting the appropriate entry can cause a customization window to appear at the configuration module whereby the user(s) can provide the customized name using peripheral input device(s) **117**. FIG. **12** illustrates an exemplary customization window whereby the user(s) can customize the name of a physical port. When the user(s) select a new customized name, the new customized name can replace a previous customized name.

In some embodiments, the configuration module can provide another drop down list for selecting how much time (e.g., 4 hours, 8 hours, 11, hours, and/or always) to light up an electronic display of user interface **111** (FIG. **1**), if applicable.

In further embodiments, KVM switching device **101** (FIG. **1**) can be configured to receive a configuration input from the user(s) prompting KVM switching device **101** (FIG. **1**) to configure and/or re-configure user interface **111** (FIG. **1**). In some embodiments, KVM switching device **101** (FIG. **1**) can be configured to receive the configuration input upon completion of pairing with user interface **111** (FIG. **1**). In the same or different embodiments, the user(s) can provide the configuration input by pressing a configuration input mechanism (e.g., a pin-hole mechanical button) of user interface **111** (FIG. **1**). In these embodiments, the user(s) may have to depress the configuration input mechanism for a specified amount of time (e.g., five seconds). The configuration module can be configured to provide default names and/or colors for physical port(s) **207** and/or host computer system(s) **102** where the user(s) do not select otherwise.

Skipping ahead now in the figures, FIG. **19** illustrates a flow chart for an embodiment of method **1900**. Method **1900** is merely exemplary and is not limited to the embodiments presented herein. Method **1900** can be employed in many different embodiments or examples not specifically depicted or described herein. In some embodiments, the procedures, the processes, and/or the activities of method **1900** can be performed in the order presented. In other embodiments, the procedures, the processes, and/or the activities of the method **1900** can be performed in any other suitable order. In still other embodiments, one or more of the procedures, the processes, and/or the activities in method **1900** can be combined or skipped.

Method **1900** can comprise procedure **1901** of providing a keyboard-video-mouse (KVM) switching device. The KVM switching device can be similar or identical to KVM switching device **101** (FIG. **1**).

Method **1900** can comprise procedure **1902** of providing one or more host computer systems. The host computer system(s) can be similar or identical to host computer system(s) **102** (FIG. **1**).

Method **1900** can comprise procedure **1903** of providing a control terminal. The control terminal can be similar or identical to all or part of control terminal **113** (FIG. **1**).

Method **1900** can comprise procedure **1904** of providing a user interface. The user interface can be similar or identical to user interface **111** (FIG. **1**).

Method **1900** can comprise procedure **1905** of coupling the KVM switching device to the host computer system(s). Method **1900** can also comprise procedure **1906** of coupling the KVM switching device to the control terminal, and method **1900** can further comprise procedure **1907** of coupling the user interface to the KVM switching device.

Returning again to the figures, FIG. **16** illustrates a flow chart for an embodiment of method **1600**. In some embodiments, method **1600** can be implemented by executing one or more computer instructions configured to be run on one or more processors and to be stored on one or more storage modules of a computer system. The computer system can be similar or identical to computer system **1700** (FIG. **17**) and/or the virtual port computer system described above with respect to system **100** (FIG. **1**). Method **1600** is merely exemplary and is not limited to the embodiments presented herein. Method **1600** can be employed in many different embodiments or examples not specifically depicted or described herein. In some embodiments, the procedures, the processes, and/or the activities of method **1600** can be performed in the order presented. In other embodiments, the procedures, the processes, and/or the activities of method **1600** can be performed in any other suitable order. In still other embodiments, one or more of the procedures, the processes, and/or the activities in method **1600** can be combined or skipped.

Method **1600** can comprise procedure **1601** of coupling a user interface to a keyboard-video-mouse (KVM) switching device. The KVM switching device is configured to route host computer audio-visual data from one or more host computer systems to a control terminal and the KVM switching device comprises a virtual port. The user interface can be similar or identical to user interface **111** (FIG. **1**), the KVM switching device can be similar to KVM switching device **101** (FIG. **1**), the host computer system(s) can be similar or identical to host computer system(s) **102**, the control terminal can be similar or identical to all or part of control terminal **113** (FIG. **1**), the virtual port can be similar or identical to virtual port **206** (FIG. **2**), and/or the host computer audio-visual data can be similar or identical to the host computer audio-visual data described above with respect to system **100** (FIG. **1**). In many embodiments, procedure **1601** of coupling the user interface to the KVM switching device can be performed similarly to as described above with respect to system **100** (FIGS. **1** & **2**). FIG. **20** illustrates an exemplary procedure **1601**.

Referring to FIG. **20**, procedure **1601** can comprise process **2001** of detecting whether the user interface is presently coupled to the KVM switching device. If upon or after performing process **2001**, no user interface is detected, procedure **1601** can continue with process **2002** of switching the KVM switching device to the virtual port. After performing process **2002**, procedure **1601** can comprise process **2003** of presenting switching device audio-visual data (e.g., at the control terminal) to one or more users of the KVM switching

device, where the switching device audio-visual data instructs the user(s) to couple the user interface to the KVM switching device. Process **2001**, process **2002**, and/or process **2003** can be repeated until the user interface is detected upon performing process **2001**. Upon initially performing process **2001**, if the user interface is detected, then process **2002** and/or process **2003** can be omitted.

Referring again to FIG. **16**, method **1600** can continue with procedure **1602** of pairing the user interface to the KVM switching device using the virtual port of the KVM switching device. In many embodiments, procedure **1602** of pairing the user interface to the KVM switching device can be performed in a manner similar to that described above with respect to system **100** (FIGS. **1** & **2**). FIG. **21** illustrates an exemplary procedure **1602**.

Referring to FIG. **21**, procedure **1602** can comprise process **2101** of checking whether the KVM switching device is presently paired with the user interface. If upon or after performing process **2101**, the KVM switching device and the user interface are determined to not be presently paired, procedure **1601** can continue with process **2102** of automatically or manually switching the KVM switching device to the virtual port. Procedure **1602** can continue with process **2103** of presenting switching device audio-visual data (e.g., at the control terminal) to the user(s), where the switching device audio-visual data instructs the user(s) to provide a code presented by the user interface via the user interface and/or the control terminal. Meanwhile, procedure **1602** can also comprise process **2104** of presenting user interface audio-visual data (e.g., at the user interface) to the user(s), where the user interface audio-visual data comprises the code. In some embodiments, process **2104** can be performed after or approximately simultaneously with process **2103**. The user interface audio-visual data can be stored in a memory module of the user interface.

Procedure **1602** can comprise process **2105** of unpairing a previously paired user interface from the KVM switching device (e.g., erasing previous pairing data from one or more memory modules of the KVM switching device). Process **2105** can be performed after or approximately simultaneously with process **2101**, process **2102**, process **2103**, and/or process **2104**.

Procedure **1602** can continue with process **2106** of receiving the code from the user(s) at the at least one of the control terminal (e.g., via one or more peripheral input devices) or the user interface (e.g., via one or more user interface inputs of the user interface). The peripheral input device(s) can be similar or identical to peripheral input device(s) **117** (FIG. **1**). The user interface input(s) can be similar or identical to the user interface input(s) described above with respect to system **100** (FIG. **1**). Procedure **1602** can continue further with a process of comparing the code received from the user(s) against the code of the user interface audio-visual data. If after or upon performing the process of comparing the code received from the user(s) against the code of the user interface audio-visual data, the codes do not match, then procedure **1602** can continue with a process of presenting switching device audio-visual data, where the switching device audio-visual data instructs the user(s) to re-enter the code presented at the user interface via the user interface and/or the control terminal. If the codes match, the process of presenting switching device audio-visual data, where the switching device audio-visual data instructs the user(s) to re-enter the code presented at the user interface via the user interface and/or the control terminal can be omitted from procedure **1602**.

Continuing with FIG. **16**, method **1600** can proceed with procedure **1603** of configuring the user interface to permit the user interface to control the KVM switching device using the virtual port, which can occur after the KVM switching device is paired with the user interface. In many embodiments, procedure **1603** of configuring the user interface to permit the user interface to control the KVM switching device can be performed in a manner similar to that described above with respect to system **100** (FIGS. **1** & **2**). FIG. **22** illustrates an exemplary procedure **1603**.

Procedure **1603** can comprise process **2201** of detecting a configuration status of the user interface. If when performing process **2201**, the configuration status indicates that the user interface is already configured to control the KVM switching device, procedure **1603** can continue with process **2202** of activating a first physical port of the KVM switching device. Performing process **2202** can comprise an activity of routing host computer audio-visual data of a first or predetermined host computer system of the host computer system(s) that is coupled to the first physical port to the control terminal. The first host computer system can be similar or identical to host computer system **103** (FIG. **1**). The first physical port can be similar or identical to physical port **202** (FIG. **2**). In those embodiments where process **2202** is performed, one or more of processes **2203**-**2210**, as described below, can be omitted from procedure **1603**.

If, when performing process **2201**, the configuration status indicates that the user interface is not already configured to control the KVM switching device, procedure **1603** can continue with process **2203** of disabling the user interface input(s) of the user interface until the user interface is configured. Then, procedure **1603** can continue with process **2204** of presenting switching device audio-visual data (e.g., at the control terminal) to the user(s), where the switching device audio-visual data comprises a configuration module (e.g., an onscreen configuration module) displayed by the control terminal and configured to accept command data from the peripheral input device(s)) configured to permit the user(s) to configure (e.g., using the peripheral input device(s)) the manner in which the user interface controls the KVM switching device with respect to the host computer system(s). In those embodiments where one or more of processes **2203**-**2210** are performed, process **2202** can be omitted from procedure **1603**.

Procedure **1603** can comprise optional process **2205** of presenting user interface audio-visual data (e.g., at the user interface) to the user(s), where the user interface notifies the user(s) that the user interface is almost configured (e.g., ready for use). Process **2205** can be performed after or approximately simultaneously with process **2203** and/or process **2204**.

Procedure **1603** can comprise a process of receiving command data from the user(s) (e.g., via the peripheral input device(s)), where the command data comprises one or more configuration settings (e.g., numbers, names, symbols, and/or colors associated with the user interface input(s), the physical port(s) of the user interface, and/or the host computer system(s) as described above with respect to system **100** (FIGS. **1** & **2**)) for the user interface provided via the configuration module. This process can be performed after process **2205** and/or before process **2206**, as described below.

Procedure **1603** can comprise process **2206** of receiving command data from the user(s) (e.g., via the peripheral input device(s)), where the command data comprises affirmation that the user(s) are finished configuring the user interface. Process **2206** can be performed after one or more of processes **2202**-**2205** are performed.

Procedure **1603** can comprise process **2207** of updating the user interface with the configuration settings provided via the configuration module. Process **2207** can comprise receiving

command data from the user(s) (e.g., via the peripheral input device(s)), where (e.g., after or approximately simultaneously as provided) the command data comprises one or more configuration settings for the user interface provided via the configuration module.

Procedure **1603** can comprise process **2208** of presenting the configuration settings at the user interface. Procedure **1603** can continue with process **2209** of indicating at the KVM switching device that the user interface is configured. Procedure **1603** can continue with process **2210** of activating the first or predetermined physical port of the user interface. Process **2210** can be similar or identical to process **2202**, as described above.

Referring again to FIG. **16**, method **1600** can comprise procedure **1604** of turning on the KVM switching device. Procedure **1604** can be performed before performing one or more of procedures **1601-1603**.

Skipping ahead again in the drawings, FIG. **29** illustrates a flow chart for an embodiment of method **2900**. Method **2900** is merely exemplary and is not limited to the embodiments presented herein. Method **2900** can be employed in many different embodiments or examples not specifically depicted or described herein. In some embodiments, the procedures, the processes, and/or the activities of method **2900** can be performed in the order presented. In other embodiments, the procedures, the processes, and/or the activities of the method **2900** can be performed in any other suitable order. In still other embodiments, one or more of the procedures, the processes, and/or the activities in method **2900** can be combined or skipped.

Method **2900** can comprise activity **2901** of manufacturing a keyboard-video-mouse (KVM) switching device. The KVM switching device can be similar or identical to KVM switching device **101** (FIG. **1**). In some embodiments, performing activity **2901** can comprise configuring one or more physical ports of the KVM switching device to be disabled until a user interface is paired with the KVM switching device. The physical port(s) can be similar or identical to physical port(s) **207** (FIG. **2**), and the user interface can be similar or identical to user interface **111** (FIG. **1**).

Method **2900** can comprise activity **2902** of configuring the keyboard-video-mouse switching device to communicate with one or more host computer systems, a control terminal, and the user interface. The host computer system(s) can be similar or identical to host computer system(s) **102** (FIG. **1**), and the control terminal can be similar or identical to control terminal **113** (FIG. **1**). In some embodiments, activity **2902** can comprise configuring the user interface to communicate with the KVM switching device through at least one of wired or wireless communication.

Method **2900** can comprise activity **2903** of configuring the user interface to permit selection of at least one selected host computer system of the host computer system(s) after the user interface is paired with the KVM switching device.

Method **2900** can comprise activity **2904** of configuring the user interface to select the selected host computer system(s) of the host computer system(s) until the user interface is paired with the KVM switching device.

Method **2900** can comprise activity **2905** of configuring the KVM switching device such that when (a) the KVM switching device is communicating with the host computer system(s) and the control terminal and (b) the user interface is paired with the KVM switching device, the KVM switching device is configured to route host computer audio-visual data from the selected host computer system(s) of the host computer system(s) to the control terminal. In many embodiments, one or more of activities **2903** through **2905** can be performed as part of activity **2901**.

Method **2900** can comprise activity **2906** of configuring the KVM switching device to communicate with a common access card reader. The common access card reader can be similar or identical to common access card reader **121** (FIG. **1**).

Method **2900** can comprise activity **2907** of manufacturing the user interface. In some embodiments, activity **2907** can be omitted. In other embodiments, one or more activities **2901** through **2906** and/or activity **2908** can be omitted. FIG. **30** illustrates an exemplary activity **2907**.

Referring to FIG. **30**, activity **2907** can comprise activity **3001** of providing at the user interface one or more user interface inputs configured to control selection of the selected host computer system(s) of the host computer system(s) while the user interface is paired with the KVM switching device. The user interface input(s) can be similar or identical to the user interface input(s) described above with respect to system **100** (FIG. **1**). In some embodiments, performing activity **3101** can comprise manufacturing one or more mechanical buttons comprising one or more color chips.

Further, activity **2907** can comprise activity **3002** of configuring the user interface to control the common access card reader in order to establish at least one of the one or more host computer systems being secured by the common access card reader.

Activity **2907** can comprise activity **3003** of providing a touch screen electronic display at the user interface. The touch screen electronic display can be similar to the touch screen electronic display described above with respect to user interface **111** (FIG. **1**).

Activity **2907** can comprise activity **3004** of configuring the user interface to be paired with the KVM switching device upon entry of a code.

Activity **2907** can comprise activity **3005** of configuring the user interface to disable at least one of the physical port(s).

Returning now to FIG. **29**, method **2900** can comprise activity **2908** of configuring the KVM switching device to communicate with at least one other slave device. The other slave device(s) can be similar or identical to the other slave device(s) described above with respect to system **100** (FIG. **1**).

In many embodiments, one or more of activities **2901** through **2908** can be performed simultaneously with one or more other of activities **2901** through **2908**. Further, one or more of activities **3001** (FIG. **30**) through **3005** (FIG. **30**) can be performed simultaneously with one or more other of activities **3001** through **3005**.

Turning ahead in the drawings, FIG. **31** illustrates a flow chart for an embodiment of method **3100**. In some embodiments, at least part of method **3100** can be implemented by executing one or more computer instructions configured to be run on one or more processors and to be stored on one or more storage modules of at least one computer system. The computer system(s) can be similar or identical to computer system **1700** (FIG. **17**) and/or the virtual port computer system described above with respect to system **100** (FIG. **1**). Method **3100** is merely exemplary and is not limited to the embodiments presented herein. Method **3100** can be employed in many different embodiments or examples not specifically depicted or described herein. In some embodiments, the procedures, the processes, and/or the activities of method **3100** can be performed in the order presented. In other embodiments, the procedures, the processes, and/or the activities of method **3100** can be performed in any other suitable order. In

still other embodiments, one or more of the procedures, the processes, and/or the activities in method **3100** can be combined or skipped.

Method **3100** can comprise activity **3101** of detecting a user interface at a virtual port of a keyboard-video-mouse (KVM) switching device when the user interface is coupled with the KVM switching device. The virtual port can be similar or identical to virtual port **207** (FIG. **2**); the KVM switching device can be similar or identical to KVM switching device **101** (FIG. **1**); and the user interface can be similar or identical to user interface **111** (FIG. **1**).

Method **3100** can comprise activity **3102** of pairing the user interface to the KVM switching device. In some embodiments, performing activity **3102** can comprise receiving a code at one of the user interface or a control terminal. The control terminal can be similar or identical to control terminal **113** (FIG. **1**). In many embodiments, activity **3102** can occur after activity **3101**.

Method **3100** can comprise activity **3103** of receiving a selection of at least one selected host computer system of one or more host computer systems at the KVM switching device via one or more user interface inputs of the user interface when the user interface is paired with the KVM switching device. In many embodiments, activity **3103** occurs after activity **3101** and/or **3102**. The host computer system(s) can be similar or identical to host computer system(s) **102** (FIG. **1**), and the user interface input(s) can be similar or identical to the user interface input(s) described above with respect to system **100** (FIG. **1**).

Method **3100** can comprise activity **3104** of disabling communication of the KVM switching device with the host computer system(s). In many embodiments, activity **3104** can occur before and/or after one or more of activities **3101** through **3103**. In further embodiments, activity **3104** can be repeated one or more times.

Method **3100** can comprise activity **3105** of receiving a configuration of the user interface input(s) associating the user interface input(s) with the host computer system(s). In many embodiments, activity **3105** can be performed prior to activity **3103** and/or after activities **3101** and/or **3102**.

Method **3100** can comprise activity **3106** of receiving a configuration of one or more physical ports of the KVM switching device at the user interface establishing that at least one of the physical port(s) is to be secured by a common access card reader. The physical port(s) can be similar or identical to physical port(s) **206** (FIG. **2**), and the common access card reader can be similar or identical to common access card reader **121** (FIG. **1**). In many embodiments, activity **3106** can be performed as part of activity **3105**, and vice versa. Further, in some embodiments, activities **3105** and **3106** can be performed approximately simultaneously.

Method **3100** can comprise activity **3107** of providing first instructions at the user interface regarding pairing the user interface with the KVM switching device. In some embodiments, performing activity **3107** can comprise providing the first instructions at an electronic display of the user interface. The electronic display can be similar or identical to the electronic display described above with respect to user interface **111** (FIG. **1**). In many embodiments, activity **3107** can occur after activity **3101** and/or before activity **3102**.

Method **3100** can comprise activity **3108** of providing second instructions at the user interface regarding configuring the one or more user interface inputs of the user interface. In some embodiments, performing activity **3108** can comprise providing the second instructions at the electronic display of the user interface. In many embodiments, activity **3107** can occur after activity **3102** and/or before activity **3103**.

Method **3100** can comprise activity **3109** of receiving a second selection of at least one other selected host computer system of the host computer system(s) at the KVM switching device via the user interface inputs of the user interface when the user interface is paired with the KVM switching device. In many embodiments, activity **3109** can occur after one or more of activities **3101** through **3108**.

For any of the embodiments disclosed herein, it can be appreciated that any of the audio-visual data can comprise video data and/or audio data, as appropriate. For example, although many of the examples above are discussed with respect to presenting audio-visual data visually, many embodiments could also be implemented with audible audio-visual data instead or as well.

Although the invention has been described with reference to specific embodiments, it will be understood by those skilled in the art that various changes may be made without departing from the spirit or scope of the invention. Accordingly, the disclosure of embodiments of the invention is intended to be illustrative of the scope of the invention and is not intended to be limiting. It is intended that the scope of the invention shall be limited only to the extent required by the appended claims. For example, to one of ordinary skill in the art, it will be readily apparent that methods **1600** (FIG. **16**), **1900** (FIG. **19**), **2900** (FIG. **29**), and/or **3100** (FIG. **31**), and the related procedures, process, and/or activities of each, may be comprised of many different procedures, processes, and activities and be performed by many different modules, in many different orders, that any element of FIGS. **1-31** may be modified, and that the foregoing discussion of certain of these embodiments does not necessarily represent a complete description of all possible embodiments.

All elements claimed in any particular claim are essential to the embodiment claimed in that particular claim. Consequently, replacement of one or more claimed elements constitutes reconstruction and not repair. Additionally, benefits, other advantages, and solutions to problems have been described with regard to specific embodiments. The benefits, advantages, solutions to problems, and any element or elements that may cause any benefit, advantage, or solution to occur or become more pronounced, however, are not to be construed as critical, required, or essential features or elements of any or all of the claims, unless such benefits, advantages, solutions, or elements are expressly stated in such claim.

Moreover, embodiments and limitations disclosed herein are not dedicated to the public under the doctrine of dedication if the embodiments and/or limitations: (1) are not expressly claimed in the claims; and (2) are or are potentially equivalents of express elements and/or limitations in the claims under the doctrine of equivalents.

What is claimed is:

1. A system comprising:

a keyboard-video-mouse switching device configured to communicate with one or more host computer systems, a control terminal, and a user interface;

wherein:

the keyboard-video-mouse switching device comprises a virtual port through which the user interface communicates with the keyboard-video-mouse switching device and one or more physical ports through which the one or more host computer systems communicate with the keyboard-video-mouse switching device;

the user interface is configured to permit selection of at least one selected host computer system of the one or

more host computer systems after the user interface is paired with the keyboard-video-mouse switching device;

the user interface is unable to select the at least one selected host computer system of the one or more host computer systems until the user interface is paired with the keyboard-video-mouse switching device; and

when the keyboard-video-mouse switching device is communicating with the one or more host computer systems and the control terminal and when the user interface is paired with the keyboard-video-mouse switching device, the keyboard-video-mouse switching device is configured to route host computer audio-visual data from the at least one selected host computer system of the one or more host computer systems to the control terminal;

the keyboard-video-mouse switching device and the user interface are configured to communicate with a common access card reader; and

the common access card reader is configured to secure at least one of the one or more host computer systems by requiring authentication of a common access card at the common access card reader before the keyboard-video-mouse switching device is able to route the host computer audio-visual data from the at least one selected host computer system to the control terminal if the at least one selected host computer system comprises the at least one of the one or more host computer systems being secured by the common access card reader.

2. The system of claim **1** wherein:

the user interface is separate from the control terminal even when being located proximate to the control terminal.

3. The system of claim **1** wherein:

the user interface comprises one or more user interface inputs configured to control the selection of the at least one selected host computer system of the one or more host computer systems while the user interface is paired with the keyboard-video-mouse switching device; and

each of the one or more user interface inputs is configured to be associated with one of the one or more host computer systems as configured by a user of the system.

4. The system of claim **3** wherein:

the one or more user interface inputs comprise one or more mechanical buttons comprising one or more color chips.

5. The system of claim **1** wherein:

the user interface is configured to control the common access card reader to secure the at least one of the one or more host computer systems with the common access card reader.

6. The system of claim **1** further comprising at least one of:

the user interface.

7. A method comprising:

manufacturing a keyboard-video-mouse switching device comprising a virtual port and one or more physical ports;

configuring the keyboard-video-mouse switching device to communicate with one or more host computer systems, a control terminal, and a user interface, the keyboard-video-mouse switching device being configured to communicate with the user interface through the virtual port and to communicate with the one or more host computer systems through the one or more physical ports;

configuring the user interface to permit selection of at least one selected host computer system of the one or more host computer systems after the user interface is paired with the keyboard-video-mouse switching device;

configuring the user interface to be unable to select the at least one selected host computer system of the one or more host computer systems until the user interface is paired with the keyboard-video-mouse switching device;

configuring the keyboard-video-mouse switching device such that when (a) the keyboard-video-mouse switching device is communicating with the one or more host computer systems and the control terminal and (b) the user interface is paired with the keyboard-video-mouse switching device, the keyboard-video-mouse switching device is configured to route host computer audio-visual data from the at least one selected host computer system of the one or more host computer systems to the control terminal; and

configuring the keyboard-video-mouse switching device to communicate with a common access card reader, the common access card reader being configured to communicate with the user interface and to secure at least one of the one or more host computer systems by requiring authentication of a common access card at the common access card reader before the keyboard-video-mouse switching device is able to route the host computer audio-visual data from the at least one selected host computer system to the control terminal if the at least one selected host computer system comprises the at least one of the one or more host computer systems being secured by the common access card reader.

8. The method of claim **7** further comprising:

manufacturing the user interface.

9. The method of claim **8** wherein:

manufacturing the user interface comprises providing at the user interface one or more user interface inputs configured to control the selection of the at least one selected host computer system of the one or more host computer systems while the user interface is paired with the keyboard-video-mouse switching device, each of the one or more user interface inputs being configured to be associated with a different one of the one or more host computer systems as configured by a user of the keyboard-video-mouse switching device.

10. The method of claim **9** wherein:

providing at the user interface the one or more user interface inputs comprises manufacturing one or more mechanical buttons comprising one or more color chips.

11. The method of claim **8** wherein at least one of:

manufacturing the user interface comprises configuring the user interface to control the common access card reader to secure the at least one of the one or more host computer systems with the common access card reader;

manufacturing the keyboard-video-mouse switching device comprises configuring the one or more physical ports to be disabled until the user interface is paired with the keyboard-video-mouse switching device;

manufacturing the user interface comprises providing a touch screen electronic display at the user interface;

the method further comprises configuring the keyboard-video-mouse switching device to communicate with at least one other slave device, where the common access card reader comprises a slave device;

manufacturing the user interface comprises configuring the user interface to be paired with the keyboard-video-mouse switching device upon entry of a code; or

manufacturing the user interface comprises configuring the user interface to disable at least one of the one or more physical ports.

12. The system of claim **1** wherein:

the one or more physical ports are configured to be disabled until the user interface is paired with the keyboard-video-mouse switching device.

13. The system of claim **1** wherein:

the user interface comprises a touch screen electronic display.

14. The system of claim **1** wherein:

the common access card reader is a slave device, and the keyboard-video-mouse switching device is configured to communicate with at least one other slave device.

15. The system of claim **1** wherein:

the user interface is configured to be paired with the keyboard-video-mouse switching device upon entry of a code.

16. The system of claim **1** wherein:

the user interface is configured to disable at least one of the one or more physical ports.

17. The system of claim **1** further comprising:

the one or more host computer systems.

18. The system of claim **1** further comprising:

the control terminal.

19. The system of claim **1** wherein:

the user interface is configured to control the common access card reader to secure the at least one of the one or more host computer systems with the common access card reader

the one or more physical ports are configured to be disabled until the user interface is paired with the keyboard-video-mouse switching device;

the user interface comprises a touch screen electronic display;

the common access card reader is a slave device, and the keyboard-video-mouse switching device is configured to communicate with at least one other slave device;

the user interface is configured to be paired with the keyboard-video-mouse switching device upon entry of a code; and

the user interface is configured to disable at least one of the one or more physical ports.

20. The system of claim **1** further comprising:

the user interface;

the one or more host computer systems; and

the control terminal.

* * * * *